Chapter 4

SYSTEM MODULE

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CHAPTER 4 – SYSTEM MODULE

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Introduction

System module is designed to operate in handportable phone in AMPS system. Baseband hardware is integrated to same printed circuit board with RF hardware. Module includes modem, audio filters, microcontroller, power supply, nonvolatile memory, keyboard and display. Display is a different module. The modem and audio operations is integrated to NASTA ASIC. Power supply circuits like regulators, voltage detection and charging control are integrated to custom MUUMI circuit. The microcontroller is a Hitachi H8 series controller with minimum 60–64 kbytes ROM and 2 kbytes RAM. The 2 kbyte nonvolatile EEPROM memory is a serial IIC–bus type device. This custom EEPROM includes also 16 bytes one time programmable (OTP) part for electrical serial number (ESN)

The display is a 5*7 dot matrix, 2 line liquid crystal display with single chip controller IC with negative voltage generation for LCD and RF VCOs.

Technical Specifications

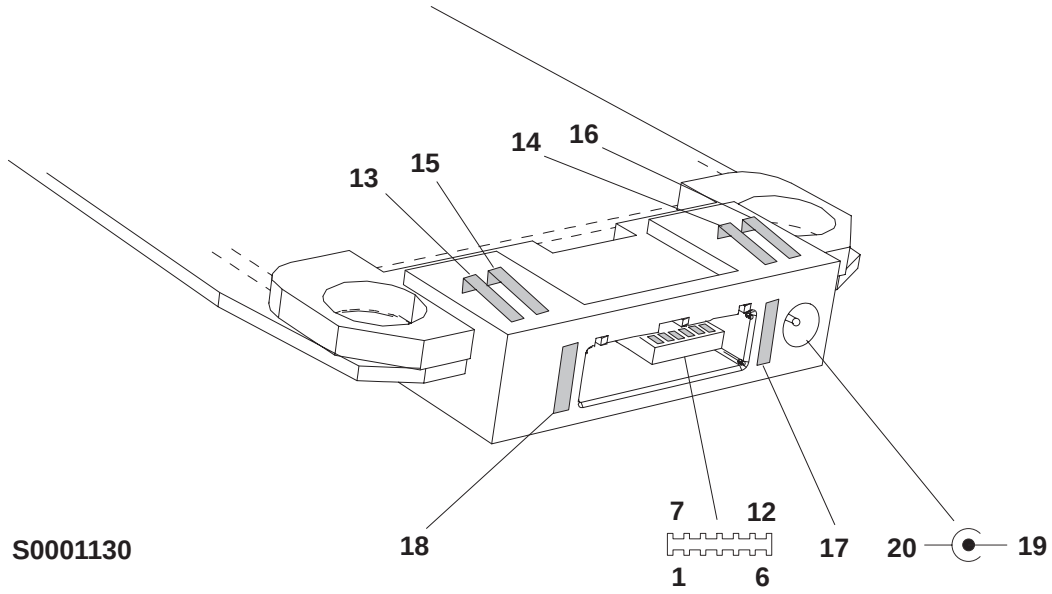
Modes of Operation

The system module hardware module has 4 basic operation modes: active (call), standby (service) and power off.

External and Internal Connections

The system module has two connector, external bottom connector and internal display module connector.

Bottom Connector



Accessory Connector

Pin:	Name:	Description:
1	GND	Digital ground
2	V_OUT	Battery voltage out • min/typ/max: 3.25...4...6 V (load 3 mA)
3	XMIC	External microphone input and accessory identification • min/max: 0...VA+1.0 V
4	NC	No connection
5	NC	No connection
6	MBUS	Bidirectional asynchronous bus • logic low level: 0...05 V • logic high level: 2.4...3.5 V
7	NC	No connection
8	SGND	Signal ground
9	XEAR	External audio output and mute control • mute on: 0...0.5 V d.c. • mute off: 1.0...2.0 V d.c.

Pin:	Name:	Description:
10	HOOK	Hook control, accessory connection detect • hook off (handset in use) : 0...05 V • hook on, (handset not in use): 2.4...3.5 V
11	NC	No connection
12	VIN	Charging voltage input • max: 16 V

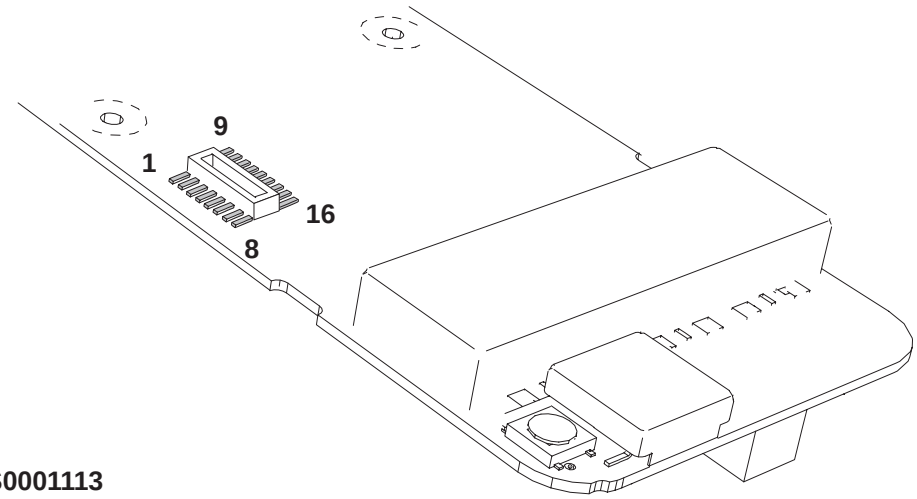
Battery Connector

Pin:	Name:	Description:
13	GND	Battery ground
14	BSI	Battery size indicator • R2=47k pullup resistor in module
15	BTEM	Battery temperature • 47 kΩ NTC in battery to gnd, 47 kΩ pullup in module
16	VBAT	Battery voltage • min/typ/max: 4.0...4.8...8.0 V

Charging connectors

Pin:	Name:	Description:
17, 19	VC	Charging voltage input • min/max: 4...16 V
18, 20	GND	Charger ground

Display Connector



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Pin:	Name:	Description:
1, 15	VBAT	Battery voltage • voltage min/typ/max: 4.2...4.8...6.8 V • illumination current typ/max: 20...40 mA
2	LIGHTS	Display illumination control • lights on voltage typ/max: 1.4...1.75 V • drive current typ/max: 100...200 µA
3	LCDCLK	Display controller clock input • 80 kHz/0...3.5 V
4, 16	GND	Ground
5	–VOUT	Negative voltage out • voltage min/typ/max: –6.0...–6.6...–7.0 V • max load current: 50 µA
6	VL	Supply voltage to controller • voltage min/typ/max: 3.1...3.3...3.5 V • loading current typ/max: 1.4...1.5 mA
7	_RESET	Controller reset input • low/high voltage: 0.6 V/2.8 V
8	RS	Register select • low/high voltage: 0.6 V/2.8 V
9	R/W	Read/write select • low/high voltage: 0.6 V/2.8 V
10	E	Enable controller bus • low/high voltage: 0.6 V/2.8 V
11–14	DB0–DB3	Controller 4–bit data bus, DB4=MSB • low/high voltage: 0.6 V/2.8 V

Baseband Block Description

Circuit Description

The module consists of following main components:

– H8/3042 16–bit single chip microcontroller with 64 kbytes ROM (EPROM) and 2 kbytes RAM

– NASTA modem and audio ASIC

– External audio amplifier with on/off control and buzzer driver circuit

– MUUMI power supply (and control), ASIC and discrete charge switch control logic

– serial I2C–bus 2 kbytes EEPROM with 16 bytes one time programmable electrical serial number (ESN) area

– NJU6428 LCD controller with 2* VL negative voltage generation is located in the separate display module

The baseband block diagram illustrates the baseband module connections and interface to charger, battery and display module.

Microcontroller

NHA–2 microcontroller is a H8/3042, that is operating in single–chip normal mode (mode 6) 64 kbyte address space. Maximum 62 kbytes ROM can be used for program. MCU operating clock (=2.4 MHz) is generated on NASTA.

Microcontroller includes 2 serial channels, 5 pcs 16–bit timer units(ITU) with PWM and interval capability, 10–bit A/D–converter with 8 channels, watchdog timer and refresh timer. Serial channel 0 is used for asynchronous M2BUS–communication and channel 1 is used for synchronous synthesizer interface. Four timer units are used for pulse width modulation (PWM) outputs: buzzer control(BUZZ_DRIVE) ITU0, charge control (CSWPWM) ITU1, TX power control (TXC) ITU2 and TX booster power control (BENA) ITU3. M2BUS net free interrupt reserves one timer unit ITU4. Keyboard interface reserves 10 I/O–lines: 4 column outputs (COL3–0) and 6 row inputs. Different power on/off switch is connected through MUUMI circuit to MCU input PWRON.

Input/Output Ports of MCU

All input/output pins are used as I/O–ports. NASTA address and data bus is connected to I/O–pins.

Port 1

Pin name	Pin use description
P10/A0	NA0, NASTA address bus ,output
P11/A1	NA1, NASTA address bus ,output
P12/A2	NA2, NASTA address bus ,output
P13/A3	NA3, NASTA address bus ,output
P14/A4	$\overline{\text{NCS}}$, NASTA chip select control output
P15/A5	$\overline{\text{NRD}}$, NASTA read control output
P16/A6	$\overline{\text{NWR}}$, NASTA write control output
P17/A7	

Port 2

Pin name	Pin use description
P20/A8	ROW0, Keyboard matrix row input 0 (input pullup used)
P21/A9	ROW1, Keyboard matrix row input 1 (input pullup used)
P22/A10	ROW2, Keyboard matrix row input 2 (input pullup used)
P23/A11	ROW3, Keyboard matrix row input 3 (input pullup used)
P24/A12	ROW4, Keyboard matrix row input 4 (input pullup used)
P25/A13	ROW5, Keyboard matrix row input 5 (input pullup used)
P26/A14	PWRON, buffered power on key input (=1 when PWR–key pressed)
P27/A15	LIGHTS, Keyboard and display illumination on/off=1/0 control output

Port 3

Pin name	Pin use description
P30/D8	ND0, NASTA data bus,I/O
P31/D9	ND1, NASTA data bus,I/O
P32/D10	ND2, NASTA data bus,I/O
P33/D11	ND3, NASTA data bus,I/O
P34/D12	ND4, NASTA data bus,I/O
P35/D13	ND5, NASTA data bus,I/O
P36/D14	ND6, NASTA data bus,I/O
P37/D15	ND7, NASTA data bus,I/O

Port 4

Pin name	Pin use description
P40/D0	SLE, Synthesizer latch enable
P41/D1	unused output
P42/D2	TXE, Transmitter regulator on/off=1/0 control
P43/D3	TXS, Transmitter synthesizer on/off control
P44/D4	RXV0, RX VCO aligning output
P45/D5	RXV1, RX VCO aligning output
P46/D6	RXV2, RX VCO aligning output
P47/D7	SLD, synthesizer lock detect input, internal pullup used

Port 5

Pin name	Pin use description
P50/A16	COL0, Keyboard column output 0 (pullup used, when input)
P51/A17	COL1, Keyboard column output 1 (pullup used, when input)
P52/A18	COL2, Keyboard column output 2 (pullup used ,when input)
P53/A19	COL3, Keyboard column output 3 (pullup used ,when input)

Port 6

Pin name	Pin use description
P60/$\overline{\text{WAIT}}$	DB0, LCD controller data bus,I/O
P61/$\overline{\text{BREQ}}$	DB1, LCD controller data bus,I/O
P62/$\overline{\text{BACK}}$	DB2, LCD controller data bus,I/O
P63/$\overline{\text{AS}}$	DB3, LCD controller data bus,I/O
P64/$\overline{\text{RD}}$	E, LCD controller bus enable control output
P65/$\overline{\text{HWR}}$	R/W, LCD controller bus read/write control output
P66/$\overline{\text{LWR}}$	RS, LCD controller register select control output

Port 7

Pin name	Pin use description
P70/AN0	VBSW, Battery (VBAT) voltage measurement input (10–bit resolution)
P71/AN1	VCSW, Charger voltage measurement input
P72/AN2	BSI, Battery size indication
P73/AN3	BTEMP, Battery temperature measurement
P74/AN4	RSSI, Receiver Signal Strenght Indication
P75/AN5	TXI, Transmitter power indication
P76/AN6	RFTEMP, RF temperature measurement
P77/AN7	XMIC, external audio and accessory identification input HEADSET ADAPTER connected: 602 nominal (685...505 accepted), Compact HF connected: 410 nominal (504...324 accepted)

Port 8

Pin name	Pin use description
P80/$\overline{\text{RFS}}$/$\overline{\text{IRQ0}}$	$\overline{\text{NINT}}$, Interrupt from NASTA
P81/$\overline{\text{CS3}}$/$\overline{\text{IRQ1}}$	HOOK, HOOK on=1/off=0 status, accessory connect interrupt (falling edge)
P82/$\overline{\text{CS2}}$/$\overline{\text{IRQ2}}$	EXT_RF, 0=external antenna in use, input (not used in C1, configure as output)
P83/$\overline{\text{CS1}}$/$\overline{\text{IRQ3}}$	unused output
P84/$\overline{\text{CS0}}$	unused output

Port 9

Pin name	Pin use description
P90/TxD0	MBUS out
P91/TxD1	SDATA,Synthesizer serial data output
P92/RxD0	MBUS in
P93/RxD1	SDA, serial EEPROM IIC–bus data
P94/SCK0/$\overline{\text{IRQ4}}$	SCL, serial EEPROM IIC–bus clock
P95/SCK1/$\overline{\text{IRQ5}}$	SCLK, serial data clock output to synthesizers

Port A

Pin name	Pin use description
PA0	XEARON, external audio amplifier on/off=1/0 and hands free mute (on=0) control
PA1/TCLKB	LCDCLK, 80 kHz clock input for slow clock PWM to timer unit 1
PA2/TIOCA0	BUZZ_DRIVE, Buzzer drive output from timer unit 0, level adjust with PWM
PA3/TIOCB0	unused output
PA4/TIOCA1	CSWPWM, Charger PWM control output (Timer unit 1)
PA5/TIOCB1	XPWROFF, Power off and watchdog clear control output, watchdog cleared on falling edge
PA6/TIOCA2	TXC, Transmitter power control PWM output (Timer unit 2)
PA7/TIOCB2	RXV3, RX VCO aligning output

Port B

Pin name	Pin use description
PB0/TP8/TIOCA3	BENA, TX booster power control PWM output (not used in C1 product)
PB1/TP9/TIOCB3	ABC/PWR key input, =0 when ABC/PWR key pressed
PB2/TP10/TIOCA4	unused output
PB3/TP11/TIOCB4	MBUSNF, MBUS net free timer input (Timer unit 4)
PB4/TP12/TOCXA4	unused output
PB5/TP13/TOCXB4	unused output
PB6/TP14	unused output
PB7/TP15	unused output

A/D Converter of MCU

A/D converter has 10 bit resolution with ±8 LSB absolute accuracy and 3.3 V ±3% reference voltage input. All 8 analog inputs can be multiplexed to A/D converter input. The A/D conversion time is 134 CPU clock cycles maximum (CKS=1) and input sampling time is 40 clock cycles.

Description of Input Channels

Channel 0: WBSW, Battery Voltage Measurement

Battery voltage can be measured from 4 V to 9.075 V nominal with 3.3 V reference voltage. The absolute accuracy is low because of the reference 3 % accuracy and A/D converter ±8 LSB accuracy. This battery voltage measurement offset error must be calibrated with input voltage 4.8 V. The A/D conversion result can be calculated from equation:

A/D readout = 1024 * (VBSW* (4/11))/VREF VREF=3.3 V

For example (voltage, min/nom/max A/D value):

4.3 V	456...484...515	cutt off limit/idle
4.8 V	509...541...575	battery voltage reference trim
6.8 V	722...767...815	high battery charging voltage limit

Channel 1: VCSW, Charger Voltage Measurement

Charger voltage can be measured up to 21.6 V nominal. The A/D conversion result can be calculated from equation:

A/D readout = 1024 * (VCSW*(18/118))/VREF VREF=3.3 V

For example:

4.8 V	198...227...257	Charger voltage reference trim
10 V	413...473...536	–
11 V	661...757...859	Max charger voltage

Channel 2: BSI, Battery Size Indication

Battery capacity can be defined with BSI resistor value calculated from equation:

BSI = 47 kΩ / ((4 mAh * 1023)/ C) –1)

A/D readout gives battery capacity from equation:
A/D readout = C/4 C= Battery capacity

For example:

470 mAh/6.8 kΩ	121...129...137
950 mAh/15 kΩ	235...247...261
1.2 Ah/20 kΩ	291...305...321
1.6 Ah/30 kΩ	382...398...416

Channel 3: BTEMP, Battery Temperature Measurement

Battery temperature measurement is implemented with 47 kΩ NTC and 47 kΩ pullup resistor. The A/D conversion readout can be calculated from equation:

A/D readout= 1024* (R_{NTC} /(R_{NTC}+47kΩ))

For example:

5 °C	705...743...780
25 °C	486...512...537
45 °C	289...305...320

Channel 4: RSSI, Receive Signal Strength

Receiving signal strength is proportional to input voltage / A/D–readout. Typical value for noise level signal strength is 0.2 V = 0062= 03E H and for maximum signal strength is 2.4 V = 0744 = 2E8 H. Input value for –90 dBm RF input level is typically 1.16 V= 0360 = 168 H . RF input level change of 1 dBm equals about 24 mV= 7.5 A/D steps.

Channel 5: TXI, Transmitter Power Level Indication

Transmitter power level indication is used to monitor the transmitted power level. A/D input is used to check, if TX power is on or off. The limit for check is 1.0 V, which is equal to 320 as A/D readout.

Channel 6: RFTEMP, RF VCXO Temperature Measure

VCXO module temperature measurement is based on CMOS temperature sensor chip with linear – 8.1 mV/K voltage output. The nominal output voltage of sensor IC is at +30 °C 1.497 V. One degree temperature change is equal to 2.5 A/D quantisize steps.

For example:

–20 °C	549...589...636
+30 °C	429...464...508
+80 °C	304...336...376

Channel 7: ID, Accessory Identification Input

Accessory identification is included in XMIC signal d.c. voltage level = ID analog input. This d.c. voltage level is defined by pullup resistor. Compact HF unit and headset adapter can be recognized from this input:

Compact HF unit	324...409...504	22 kΩ pulldown resistor
Headset adapter	505...601...685	47 kΩ pulldown resistor

LCD controller interface to microcontroller is a 4–bit parallel type including 4 bi-directional data lines DB3–0 (port 63–60), register select control RS (port 66) output, read/write control R/W (port 65) output and bus enable control E (port 64) output. Data lines DB3–0 and control signals RS ,R/W must be set to high state during standby operation because of the pullup resistors in LCD controller. LCD controller resetting requires clock during _RESET active low . This clock is created with LCD controller internal RC–oscillator changing LCDCLK output from NASTA to 3–state.

Interface between microcontroller and NASTA circuit is bidirectional 8–bit parallel type with 4 address lines. Address, data and control lines are used in microcontroller as I/O–port pins. Data lines direction must be controlled with microcontroller data direction register. Interface includes address outputs NA3–0 (port 1), data inputs (read) / outputs (write) ND7–0 (port 3), chip select control output $\overline{\text{NCS}}$ (port 14), read control output $\overline{\text{NRD}}$ (port 15) , write control output $\overline{\text{NWR}}$ (port 16) and interrupt input $\overline{\text{NINT}}$ (port 80) . If NASTA circuit is not selected , control signals (read,write and chip select) must be in high state and data lines must be outputs.

The serial I2C–bus interface EEPROM is connected to MCU I/O–pins: SDA (serial data) to port 93 and SCL (serial clock) to port 94.

MCU SLEEP Mode Operation

Microcontroller is driven to sleep mode by software in order to save power. In sleep mode all I/O–pins,RAM and CPU registers are held. Timers, clock and supporting functions are active. MCU exits from sleep mode by interrupt: NASTA modem interrupt, MBUS serial communication interface interrupt (SCI 0) or operating system timer interrupt (refresh controller timer).

Audio

The main audio and modem operations are included in NASTA ASIC circuit. NASTA includes following operations:

– AMPS/TACS modem with extended standby operation
– all RX/TX audio filters, compander, limiters, mute switches
– microphone amplifier, ceramic earpiece amplifier, accessory audio output (XEAR) and input (XMIC).
– DTMF generator.
– IF counter and 8–bit D/A–output for AFC control
– voltage controlled oscillator and clock generation

The NASTA circuit is connected to MCU with 8–bit parallel bus and interrupt request line.

The 14.85 MHz clock input is generated in RF module voltage controlled crystal oscillator (VCXO). This input clock is used to synthesize 4.8 MHz clock to NASTA internal circuits. NASTA creates 2.4 MHz clock to microcontroller (CLKMCU) and 80 kHz clock to LCD controller. The buzzer driver amplifier is driven by MCU PWM output. The buzzer volume level is adjusted with pulse width. The accessory audio output line XEAR is driven by transistor pair (V53) buffer. The buffer is short circuit protected with 47 ohm series resistor and has on/off (mute) control from MCU output (XEARON). This XEAR buffer amplifier outputs more than 1.6 V DC voltage to control accessory audio to mute off state. Accessory audio input XMIC is connected also with low pass filter (R52 and C70) to MCU A/D–converter input. This accessory identification input (ID) is used to recognize the connected accessory type and check, if accessory is connected or not.

NASTA RX Signal Paths

The incoming audio, data and SAT (Supervisory Audio Tone) analog signal (DAF = N2 pin 27) is connected through the RX trimmer and the anti alias filter to modem data comparator input, to 6 kHz bandpass type SAT filter input and to receive audio filter.

The data from the anti alias filter is connected through the comparator to a Manchester decoder, which decodes Manchester data to the NRZ (Non Return to Zero) format.Modem is synchronized to the receiving data with a digital phase locked loop and a word synchronization detection block. Data validity is continuously detected, and this information is used internally when word synchronization detection is accepted.The serial data from the Manchester decoder is 3/5 majority voted, BCH–decoded, corrected and shifted to receiver register. The Receiver timing block extracts the data from received frames on control and voice channels and generates data transfer interrupts . It maintains bit and word synchronization during different frames and passes the synchronization status forward to the status register.

The SAT signal is filtered and amplified with a bandpass filter . Signal is converted to digital square wave signal with a comparator .SAT detection is done with a digital PLL/detection circuitry. The regenerated SAT is then fed to transmit summing block.

RX audio signal is selected with the input mux. Other possibilities is to select DTMF or RX mute. RX audio signal is filtered with a de–emphasis and bandpass filter. Signal is fed through amplitude expander 1:2 (EXP). RX volume level is controlled with amplifier in the range –20 ... +17.5 dB.Hands free control block includes a bandpass filter, window comparator and controller for RX TX attenuators. RX hands free attenuator has selectable minimum gain from –30...–21 dB to max 0 dB. RX and TX attenuation sum is always constant at HF use (30...21 dB). Side tone is added to earphone signal. The audio signal is fed either to earphone amplifier output (EARM, EARP) or to accessory audio amplifier output (XEAR).

NASTA TX Signal Paths

The data to be transmitted will be loaded into the transmitting data register. From the transmit data register the 8 bit data is transformed to serial data which is fed to the Manchester encoder and then to the summing block output (MOD, N2 pin 55).

Microphone signal is fed to microphone amplifier input (MIC, N2 pin 43). NASTA has a control for microphone bias current output (BIMIC, N2 pin 44). Signal source can be selected with the input multiplexer: microphone, accessory input (XMIC, N2 pin 46) or internal dtmf generator. TX hands free attenuator has selectable minimum gain from –30...–21 dB to maximum 0 dB. Signal is going to trimmer, which is tuned for nominal speech deviation or DTMF level. Signal is filtered in the TX audio bandpass filter.

Signal is fed through amplitude compressor 2:1 to the first limiter for low frequency amplitude limiting. Signal is then pre–emphasised and limited again. Signal is lowpass filtered and fed to trimmer for speech maximum deviation tuning. It is fed to the TX summing block to be summed with data, ST and SAT signals.

DTMF generator generates dual and single tones for RX and TX lines. Tolerance of DTMF frequencies is ±1.5 %.

User Interface

The user interface includes interface to display module and keyboard with illumination. The display module is connected with 16 pin connector. The display module interface includes 4 bit data bus (DB(3:0)), bus enable (E), read/write (R_W), register select (RS), reset (_RESET) and 80 kHz clock input to LCD–controller (LCDCLK). The keyboard illumination includes 12 LEDs and 2 transistor(V42, V43) drivers. Keyboard consists of 6*4 matrix and different ABC/PWR–key and PWR–switch. The keyboard interface to microcontroller includes 4 column outputs from MCU (COL(3:0)), 6 row inputs (ROW(5:0)), ABC/PWR–key input (ABCKEY) and PWR–switch input (PWRON).

Module goes to power on state always, when either ABC/PWR–key or PWR switch is pressed. The software decides, if ABC/PWR–key is active power key or not. This and other key variations is defined by software.

Power

The baseband power supplying circuit MUUMI includes:

– 3 pcs 3.3 V regulated outputs
  – VL = Logic voltage for digital circuits
  – VA = Analog voltage for analog circuits
  – VREF = Reference voltage for A/D converter and RF regulator
– switched outputs of battery (VBSW) and charger voltage (VCSW) measurement to MCU A/D–converter
– battery voltage detection and reset logic
– charger switch control output used to limit battery voltage VBAT < 8.0V
– power on/off switch input (XPWRON), buffered output to MCU (PWRON)
– watchdog timer using oscillator in COFF pin, cleared by falling edge input in PWROFFX, elapsing time for WD timer is 1...3 seconds
– M2BUS open drain output driver

The charge switch driving circuit is implemented with discrete components. This circuit includes transient voltage protection, soft charge switching, low voltage battery charging and battery disconnecting with charger connected protection. This circuit also limits battery voltage when charger is connected to protect MUUMI and TX transistors.

Power Circuit Operation

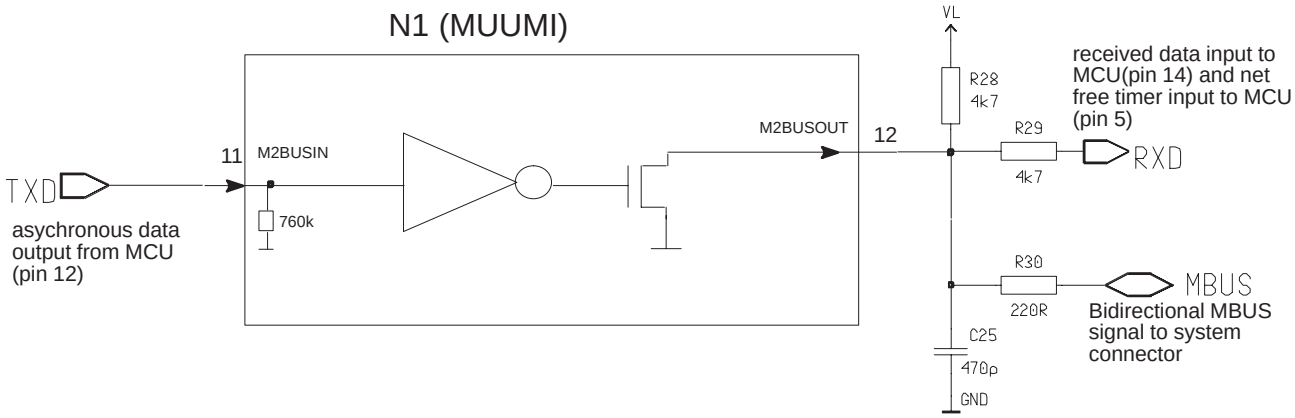
NHA–2 power circuitry have three different operating modes: POWER OFF, RESET and POWER ON. In POWER OFF state MUUMI regulator outputs are disabled and reset control output signal (PURX) is active low. MUUMI internal oscillator at pin COFF is working in all operating modes. MUUMI goes through short RESET state (100 ms) to POWER ON–state, if PWR–button is pressed or charger voltage input is connected to charging input VC (charging voltage detection in MUUMI input VCHAR is level active). In RESET–state regulator outputs VL, VA and VREF are active and PURX–signal is active low. If battery voltage VBAT is lower than 4.1 V (3.9 V...4.3 V) the circuit cannot go to POWER ON state. MUUMI goes also to RESET state, when battery voltage is falling below 3.9 V (3.7 V...4.1 V). This situation is possible, when battery is fully discharged or battery is disconnected.

In POWER ON mode all regulator outputs are active and MUUMI reset signal output PURX is inactive high. Microcontroller XPWROFF–output signal clears at falling edge the watchdog inside MUUMI. If the watchdog is not cleared, MUUMI goes to POWER OFF state. When the charger is connected and battery voltage is higher than 4.1 V, module stays in POWER ON mode.

The microcontroller controls battery charging with CSWPWM output and MUUMI limits the maximum battery voltage to 7.6 V with CHRGSW–output. No current flows from charger (VC) to battery, if MCU output CSWPWM is active low and _RESET signal is inactive high. The battery is charged also, when charger is connected and _RESET signal is active low. The charging circuit charges the battery during RESET to higher than 4.3 V

MBUS Hardware Description

MBUS hardware interface consists of serial communication interface channel inside MCU, net free timer (MCU), open drain output driver (MUUMI), 4.7 kΩ pull–up resistor and protection/filtering resistor/capasitors. MBUS voltage levels are based to 3.3 V supply voltage.



ESN Description

The Electrical Serial Number can be programmed only once and cannot be manipulated in the field. The custom EEPROM circuit includes 16 bytes one time programmable (OTP) part for the ESN. The ESN component is a SO–8 package soldered to main printed circuit board.

The software of the microcontroller is not alterable and cannot even be read, because of the microcontroller security option. The microcontroller program memory is either OTP or mask type.

RF Block Description

Receiver

The receiver is a dual–conversion superheterodyne using two intermediate frequencies, 45 MHz and 450 kHz.

The RF signal from the duplexer RX port is applied to the RF amplifier. The amplifier is realized with transistor V700. Amplifier stage input matching is accomplished by C701. R700 and R701 are used for biasing. Output matching is carried out by Z03 and Z04. Components C702 and C703 are used for RF bypassing. The RF amplifier and the IF circuit are connected in series with R702 so that the same supply current is passed through both stages.

Next the signal is filtered with Z703. The filter is followed by a single balanced diode mixer, realized with Z701, Z711, Z712, C709, C716 and V701.

After the mixer the 45 MHz IF signal is filtered with crystal filter Z702. The matching between mixer and the filter is realized with L706 and C706. Next the IF signal is amplified by V703. Input matching is realized with C714, L702 and L705. The biasing is realized with R713, R714 and R710. From the amplifier the IF–signal is applied to the second mixer.

The second mixer, the LO buffer transistor, IF amplifier and quadrature detector are all integrated in the circuit N700. The second LO frequency, 44.55 MHz, is third harmonic off the VCXO frequency. LO signal is realized with tank circuit C719 and L710. After the mixer the 450 kHz IF signal is filtered with ceramic filter Z704. Between the filter and IF amplifier is a band–pass filter consisting of C728, L709 and C730. The IF amplifier output signal is phase shifted by resonance circuit C727, C723, R712 and L704. After this the signal is fed to a quadrature detector.

Signal DAF is low pass filtered by R716 and C734. The DAF, RSSI and 2nd IF signal (450 kHz) are fed to the audio/logic unit.

RX Synthesizer

The first injection frequency is generated by a digital phase locked loop (PLL). The output frequency of the loop (LO) is obtained from a voltage–controlled oscillator (VCO) V602. The bandwidth of the PLL can be varied by dataword programming. The VCO output signal is amplified by transistor V601 and fed to the receiver mixer via Z06. The injection level required by the receiver mixer is about +3 dBm. In addition, the signal is fed to the dualsynthesizer circuit N650 and via R625 to a LO amplifier which is realized with V661.

The overall divisor of the chain is selected according to the desired channel.

The internal dividers of N650 are programmed with 17 bits, which are transferred serially on the SDATA (synthesizer data) line from the processor into an internal shift register also locating in N650. Data transfer is timed with SCLK clock pulses.

The divided frequency is compared with a highly stable reference frequency by a phase comparator in the PLL circuit (N650). The phase comparator controls the VCO frequency by means of a d.c. voltage through the loop filter so as to keep the divided frequency applied to the phase comparator equal to the fixed reference frequency.

The reference frequency is 30 kHz. This reference frequency is obtained from The voltage controlled crystal oscillator (VCXO). The oscillator frequency is 14.85 MHz. The VCXO frequency is divided by 495.

RX Loop Filter

Phase comparator output is pin 3. If the VCO frequency is too high, the output goes low and discharge integrating capacitor C618. After this, the DC control voltage and the VCO frequency will decrease.

If the VCO frequency is too low, the output goes high and charge the integrating capacitor C618. Thereafter the DC control voltage and the VCO frequency will go up.

Output pulses from the phase detector have to be supplied to the loop filter. The function of the integrator is to convert positive and negative pulses to DC voltage. The remaining ripple and AC components are filtered in the lowpass filter. The integrator comprises components R610, C619, C624 and C618. The lowpass filter consists of R608 and C616.

RX VCO

The VCO is a Clapp type oscillator. The oscillator's resonant frequency is determined by the circuitry Z600, C604, V603,C601, C614, C611, C612 and C613. The center frequency of the VCO is adjusted by changing amount of constant current generated by V100 in BB section. The VCO signal is amplified by buffer amplifier V601. This amplifier produces a level of –5 dBm to the synthesizer N650 and amplifier V661 in TX synthesizer via R625. The same buffer V601 produces +3 dBm level to the first mixer via Z06.

TX Synthesizer

The transmitter synthesizer generates a frequency modulated transmitter signal for the transmitter section.

The TX offset synthesizer consists of a 90 MHz PLL circuit, passive loop filter and a 90 MHz VCO equipped with a chip coil resonator. The bandwidth of the PLL can be varied by dataword programming. Modulation is brought to the VCO.

The TX signal is obtained by mixing the signals of offset synthesizer and RX synthesizer with a single balanced diode mixer. From the mixer the –10 dBm level is fed to the amplifier. The TX signal is filtered with a SAW filter before inputting it to the transmitter.

TX VCO

The VCO is a Clapp type oscillator. The oscillator's resonance frequency is determined by the circuitry L651, C659, V659, C663, C630, C631 and C675. The center frequency of the resonance circuit is not adjustable (By increasing or decreasing the capacitor C659 the resonance frequency can be changed). The VCO signal is amplified by V657 and fed to the prescaler and to the mixer.

TX Loop Filter

Output pulses from the phase detector N650 pin 17 have to be supplied to the loop filter. The integrator, which is constituted of R674, C680 and C683, converts positive and negative pulses to d.c. voltage. The remaining ripple is filtered in the low–pass filter accomplished by R672 and C665.

Transmitter

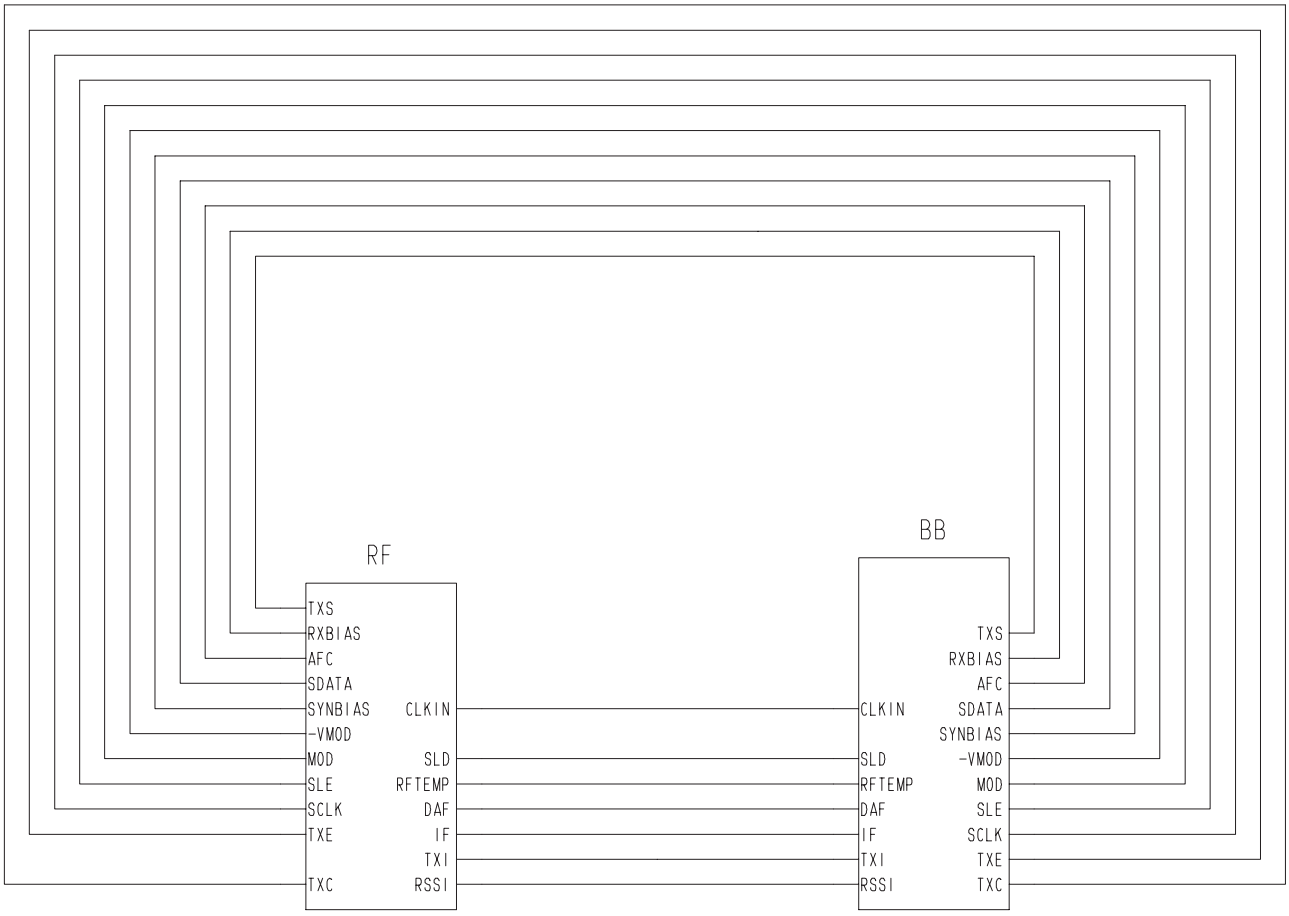
The transmitter is realized with four discrete transistors. The modulated RF signal from the TX synthesizer is applied to the input transistor V660 of the transmitter. V660 amplifies the signal for the power control stage V803, which is biased to B–class. The power level is controlled by the collector voltage of V803. Transistors V804 and V805 are biased to C–class and amplify the RF signal to the desired output power level. The amplified RF signal is fed through a low–pass filter to the duplex filter. The harmonics of the transmitter are reduced by the duplex filter. A voltage proportional to the output power is rectified from a directional coupler by d.c. biased Schottky diode V801. This rectified voltage is fed to a differential amplifier which consists of double transistor V809. There is a negative feedback from the rectified voltage to the bias voltage of diode V801 consisting of transistor V810 and associated components. The purpose of arranging the feedback is to suppress the rectified voltage to a range below 3 volts. The reference voltage is filtered from the PWM signal TXC by R814 and C826. The differential amplifier adjusts the collector voltage of the transistor V803 so that the reference voltage and the voltage proportional to the output power are equal. The transmitter is switched on when TXE goes high (logic 1), which enables the transmitter power control circuit by transistor V808 and the first stage of the transmitter. When the transmitter is inactive (TXE low) the RF level from the transmitter is reduced below –60 dBm.

The rectified voltage, which is proportional to the power output signal, is fed along TXI line through R820 to the BB–unit. This TXI line (TX power on Indicator) is used to avoid false transmission.

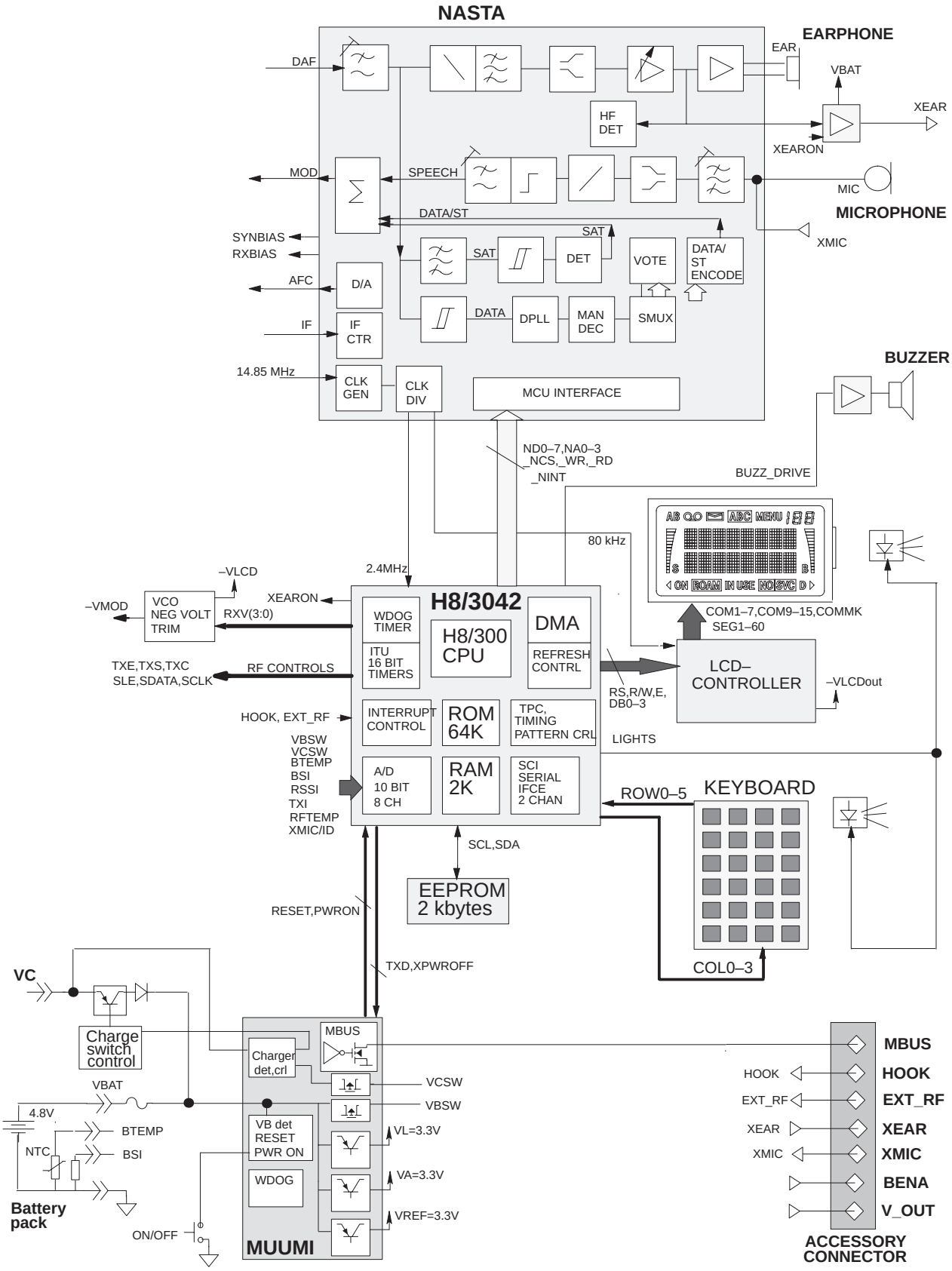
Regulators

Transistors V901 and V902 form a voltage regulator for RF parts. It is realized with discrete transistors because the output noise has to be very low. The 3.3 V reference voltage (VREF) comes from the logic module. This regulated voltage goes directly to RX part and also to RX synthesizer. TX synthesizer get it’s supply voltage via a switch. The switch is realized with transistors V651 and V654.It is controlled over digital line TXS from the logic module.

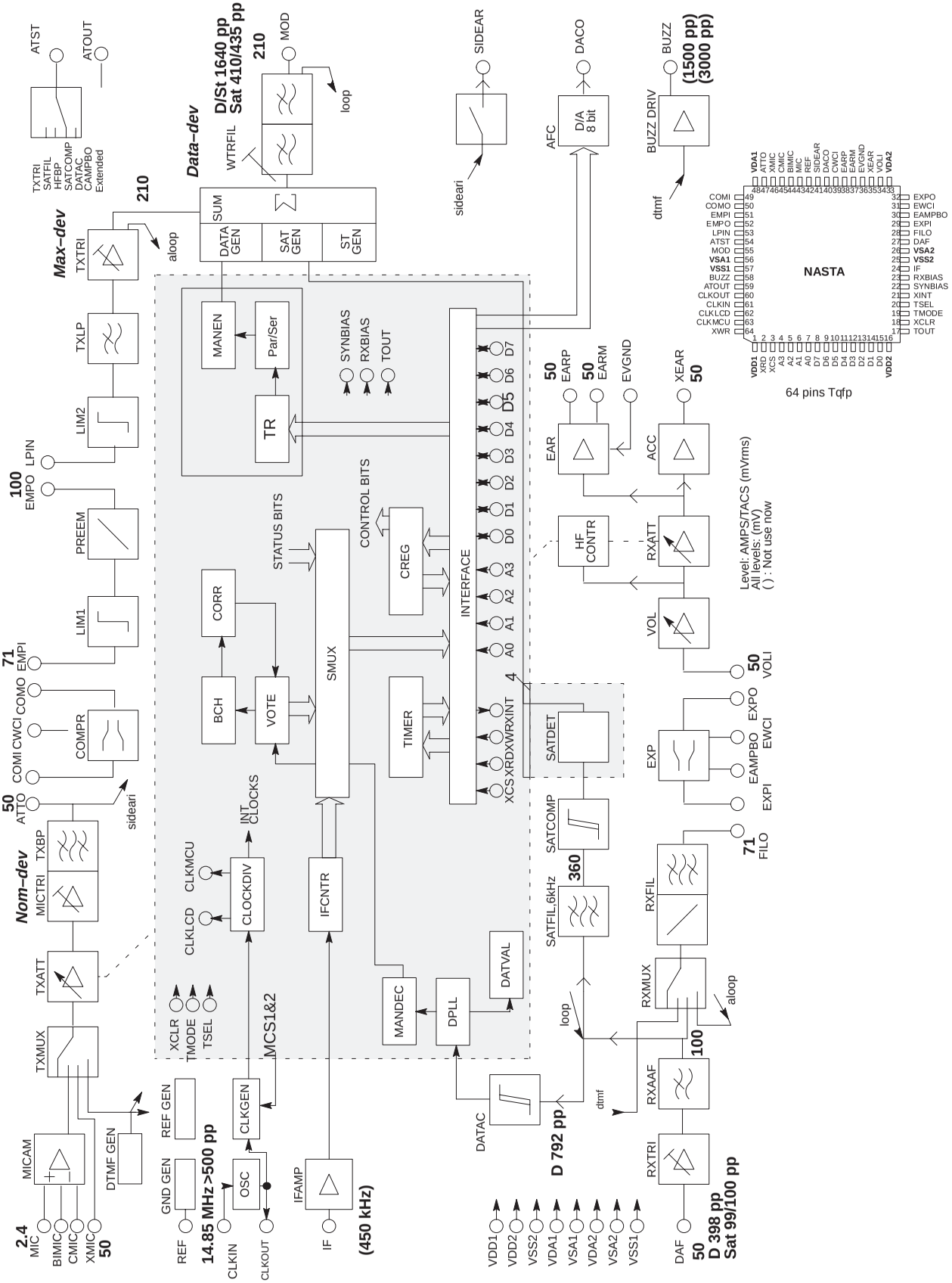
Connections between RF and BB Sections (Version: 6.0 Edit: 42)



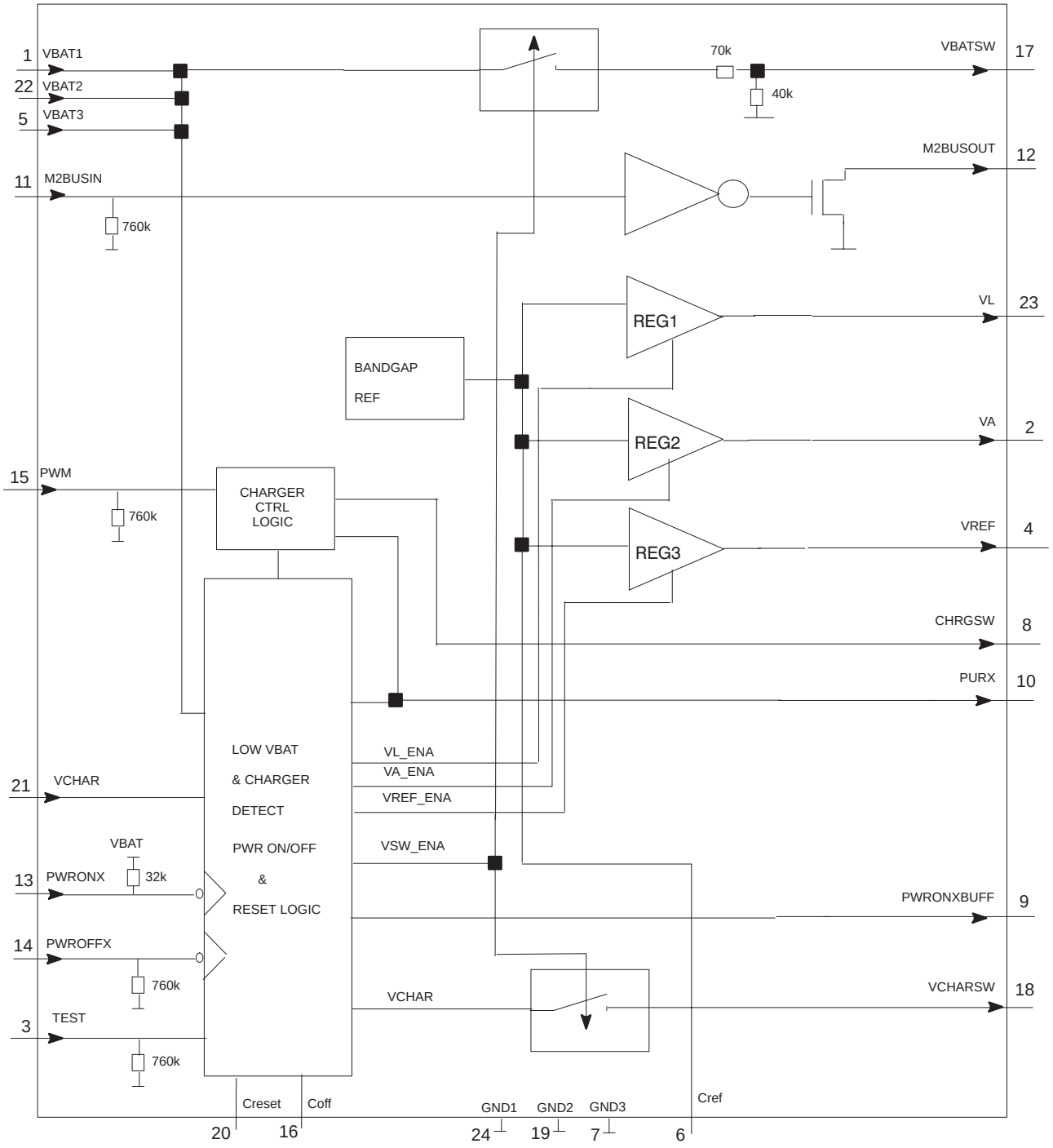
Block Diagram of Baseband



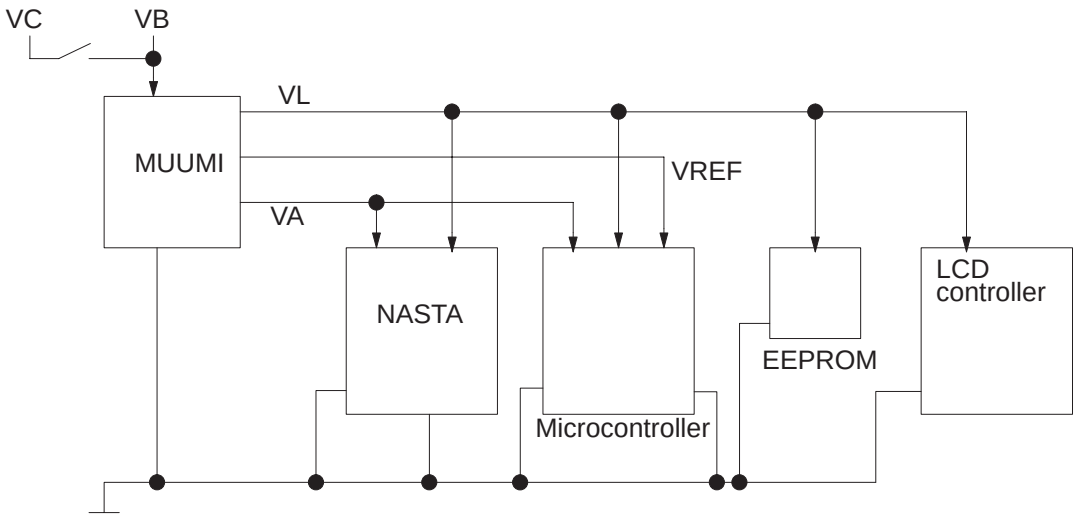
Block Diagram of NASTA



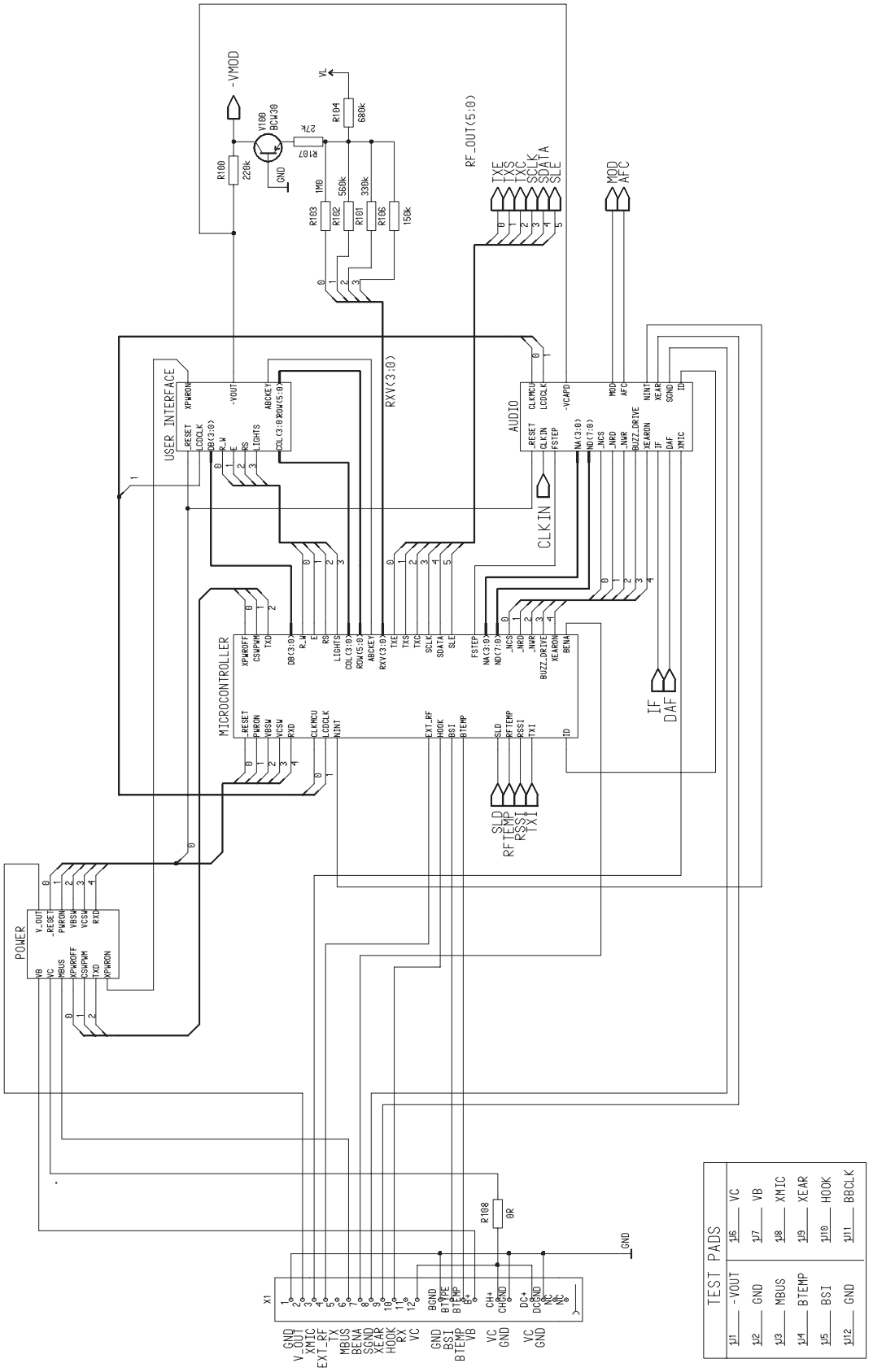
Block Diagram of MUUMI



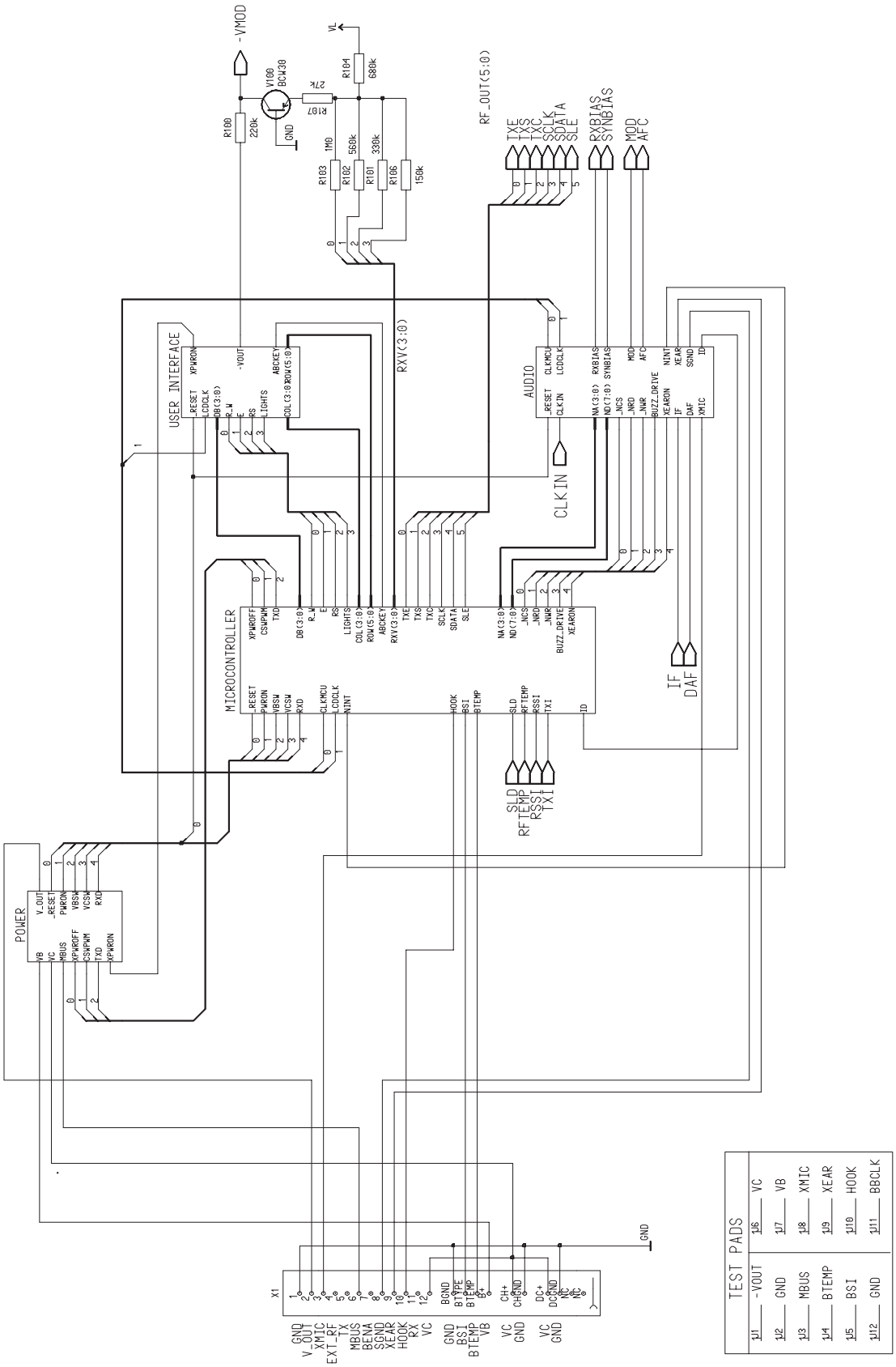
Block Diagram of Baseband Power Distribution



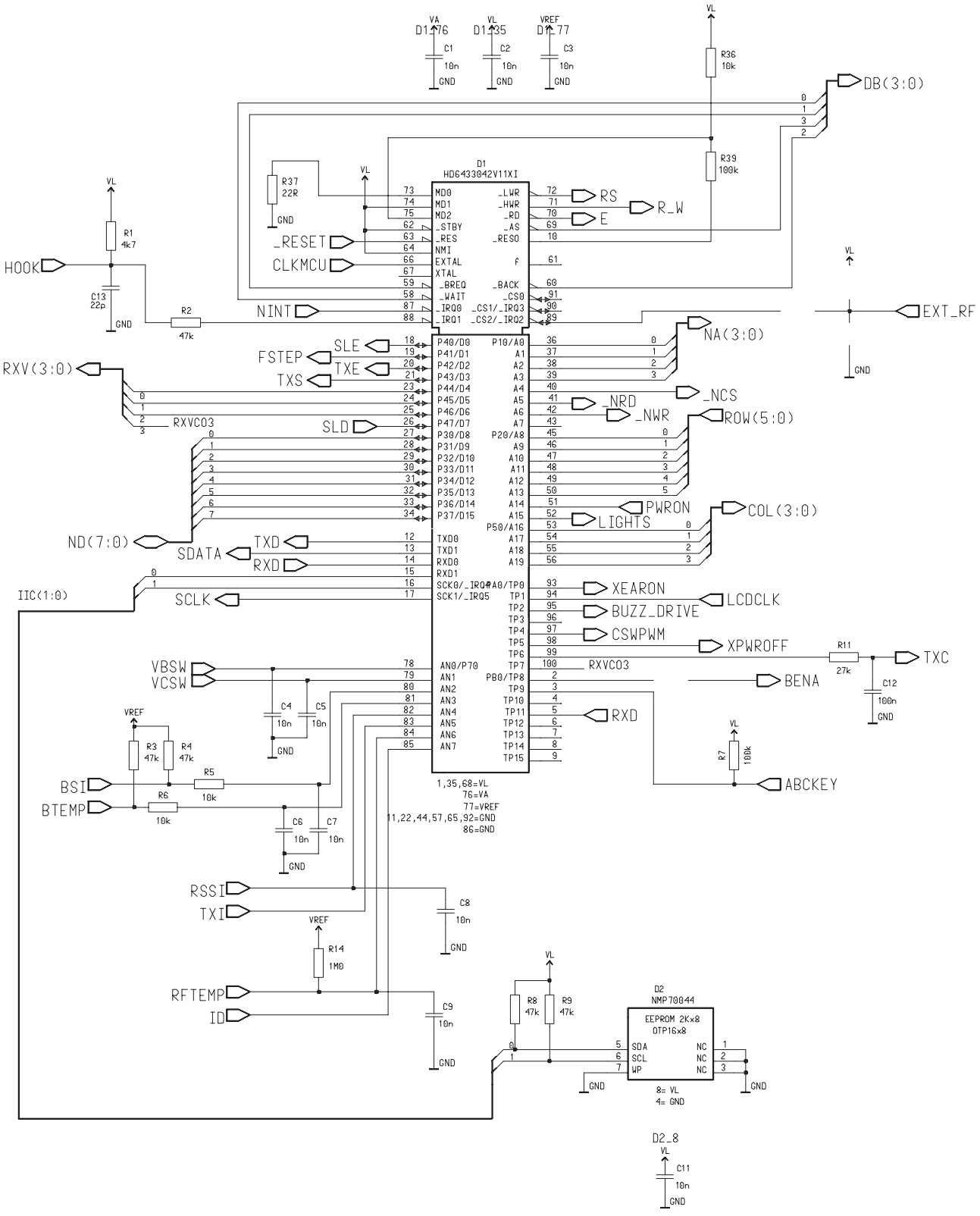
JR4: Circuit Diagram of Baseband Section (Version:12 Edit:134)



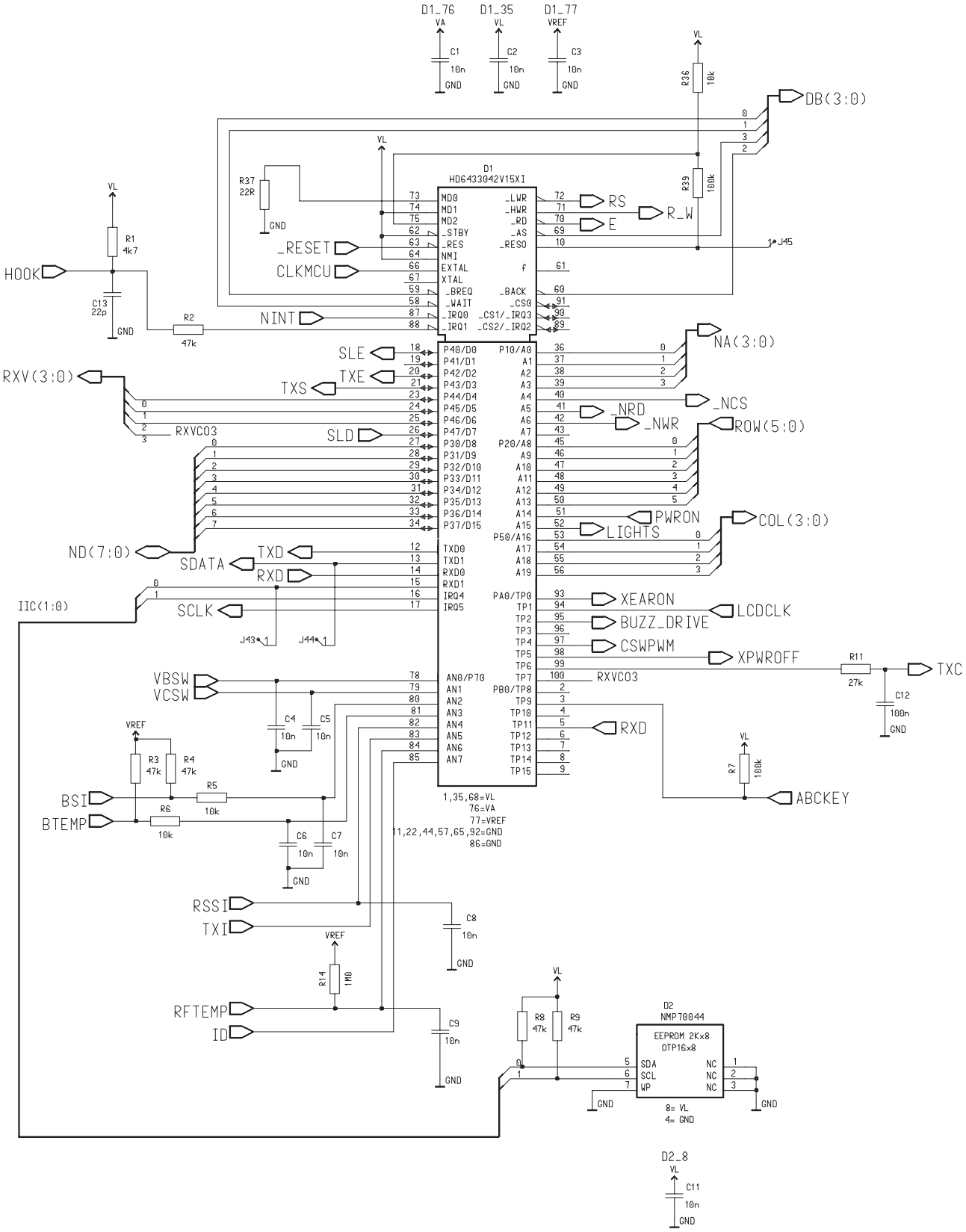
JR4: Circuit Diagram of Baseband Section (Version:13 Edit:140)



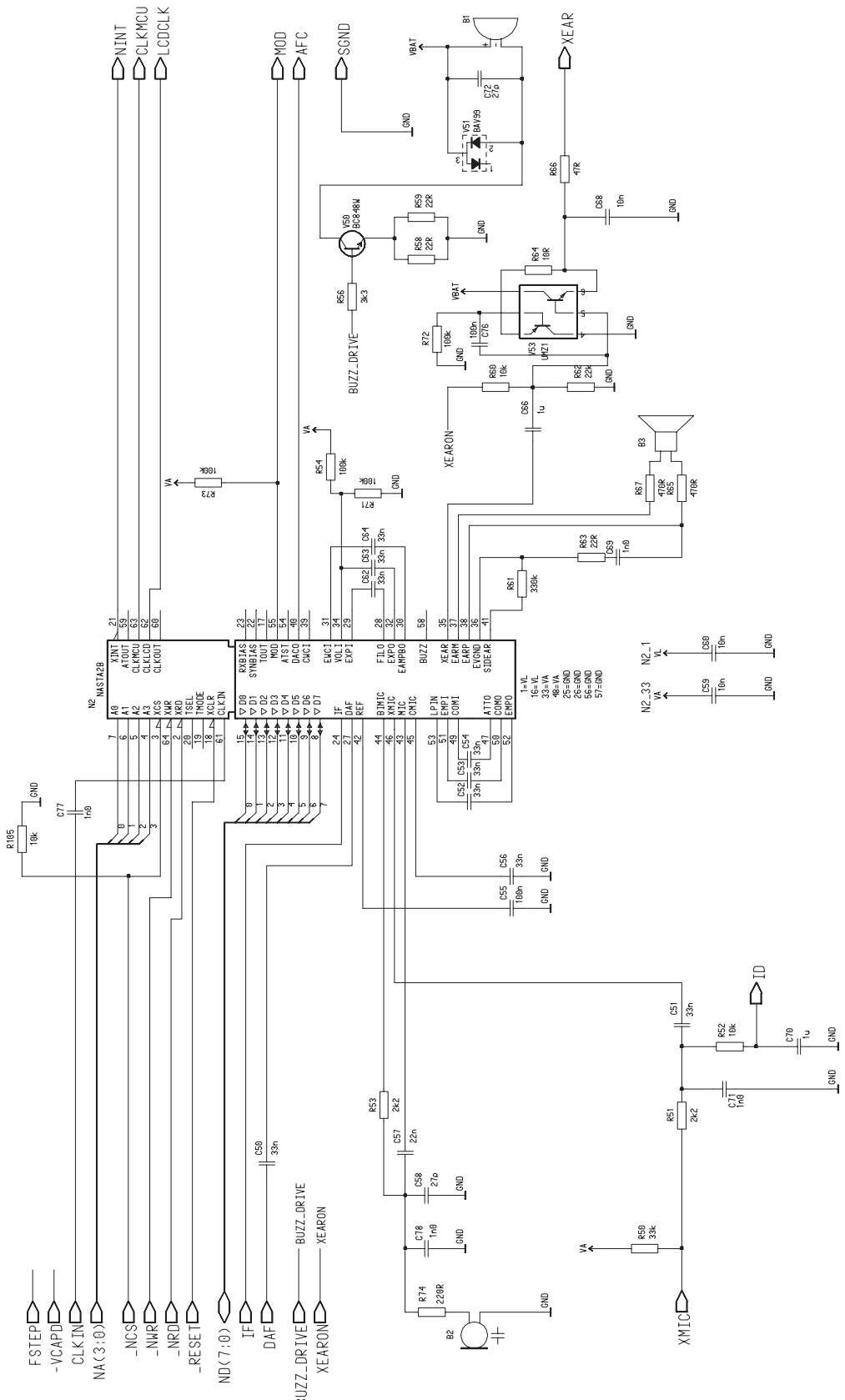
JR4: Circuit Diagram of MCU & EEPROM (Version:12 Edit: 95)



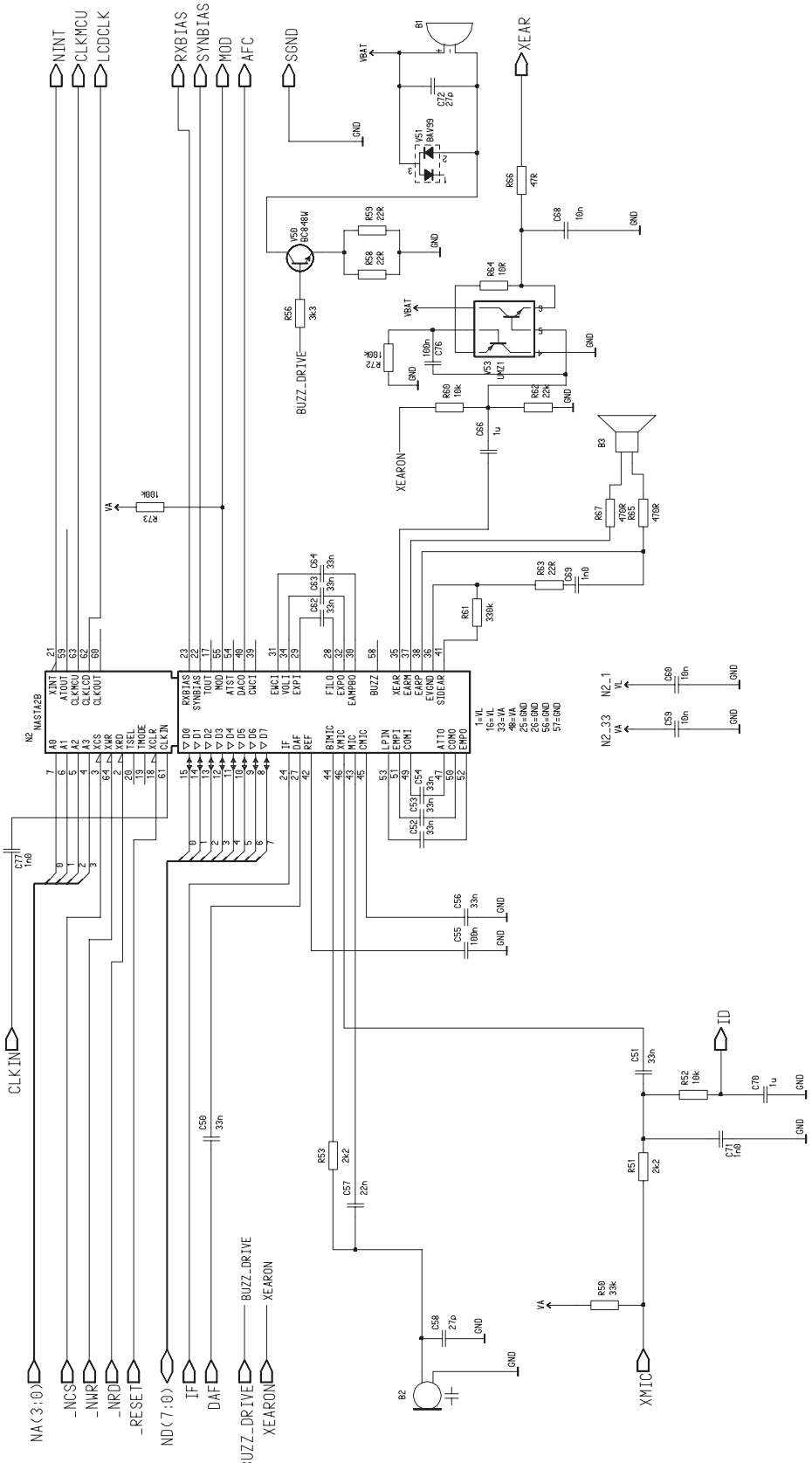
JR4: Circuit Diagram of MCU & EEPROM (Version:13 Edit: 99)



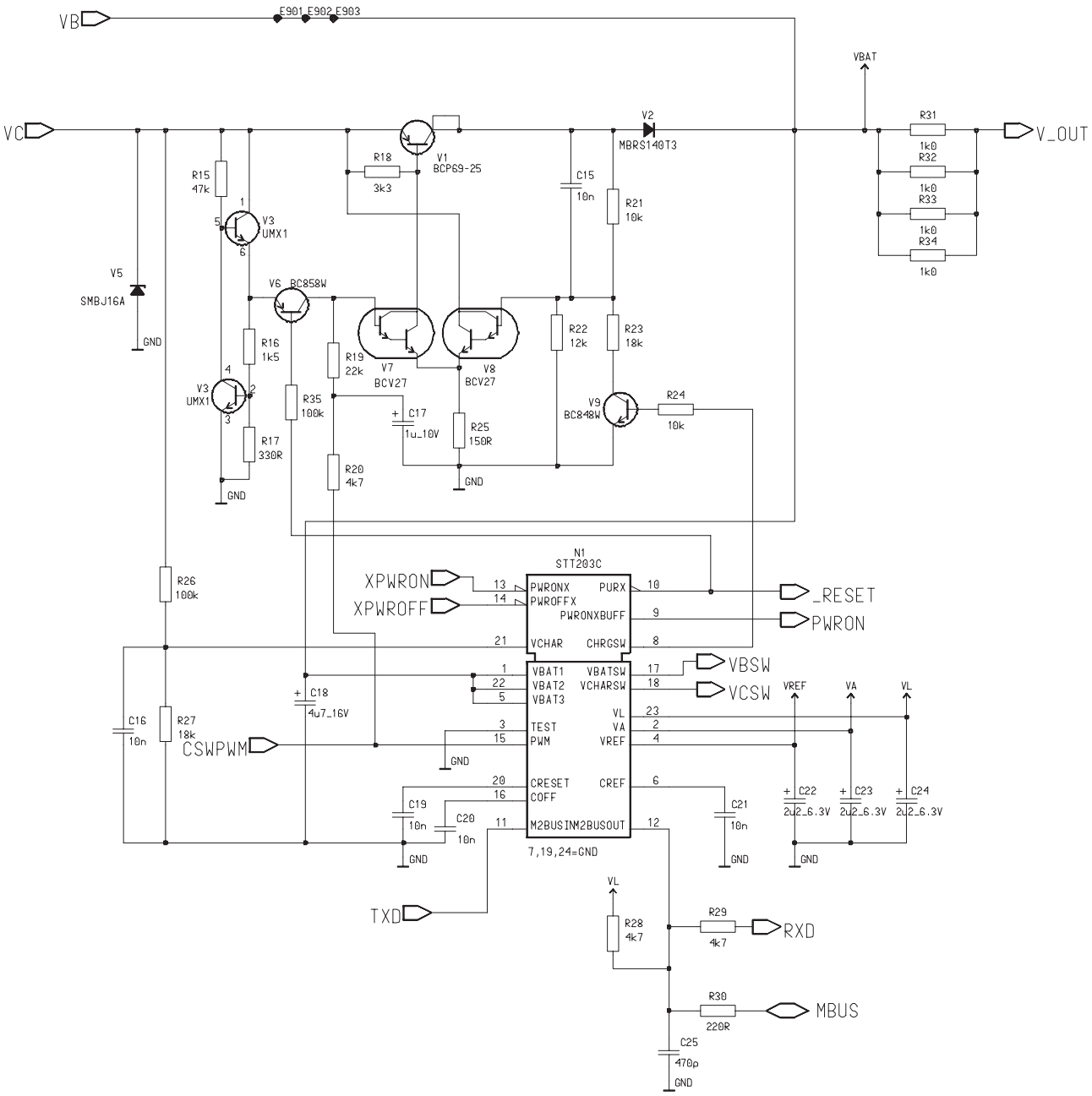
JR4: Circuit Diagram of Audio (Version:12 Edit: 144)



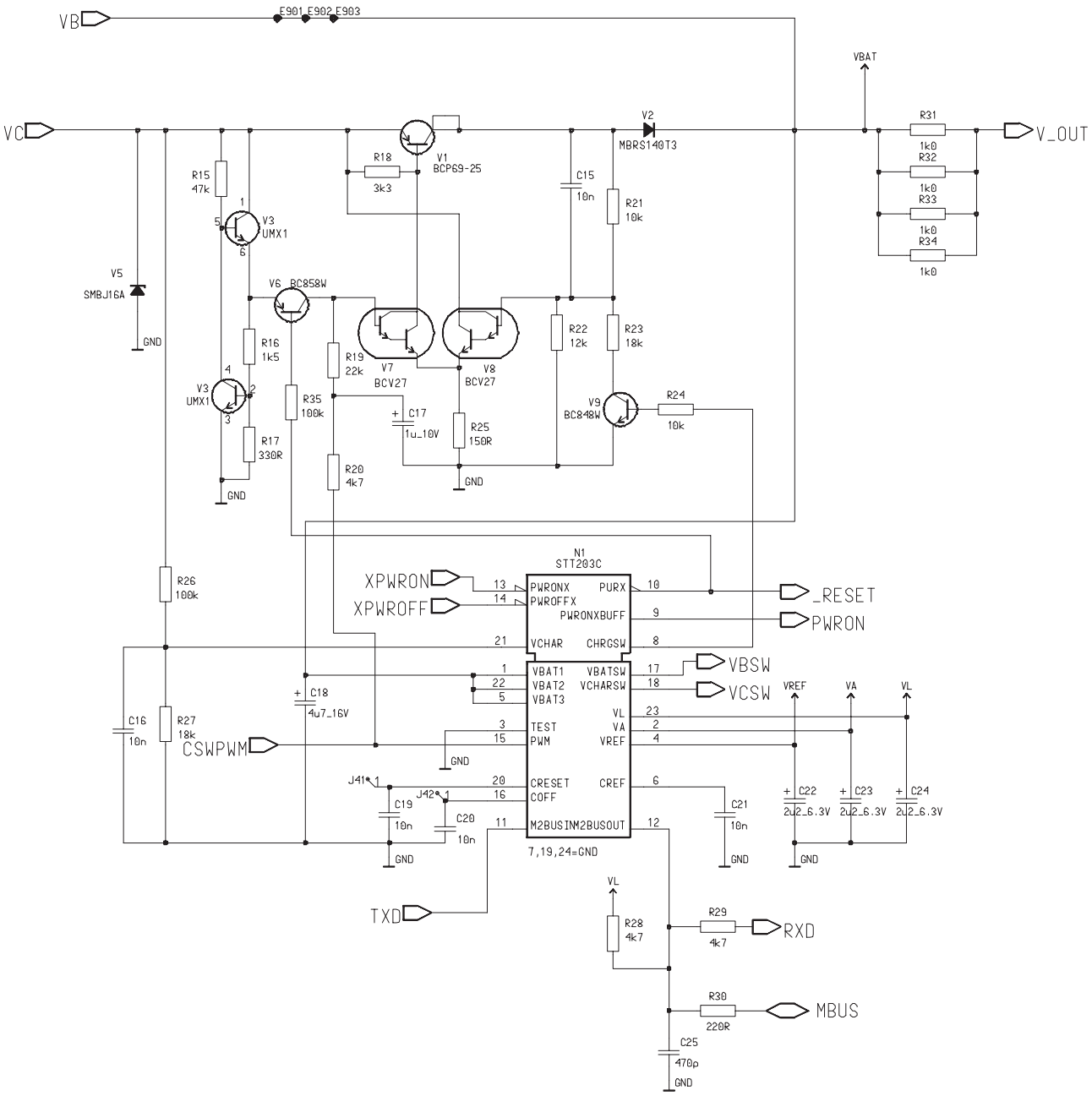
JR4: Circuit Diagram of Audio (Version:13 Edit:159)



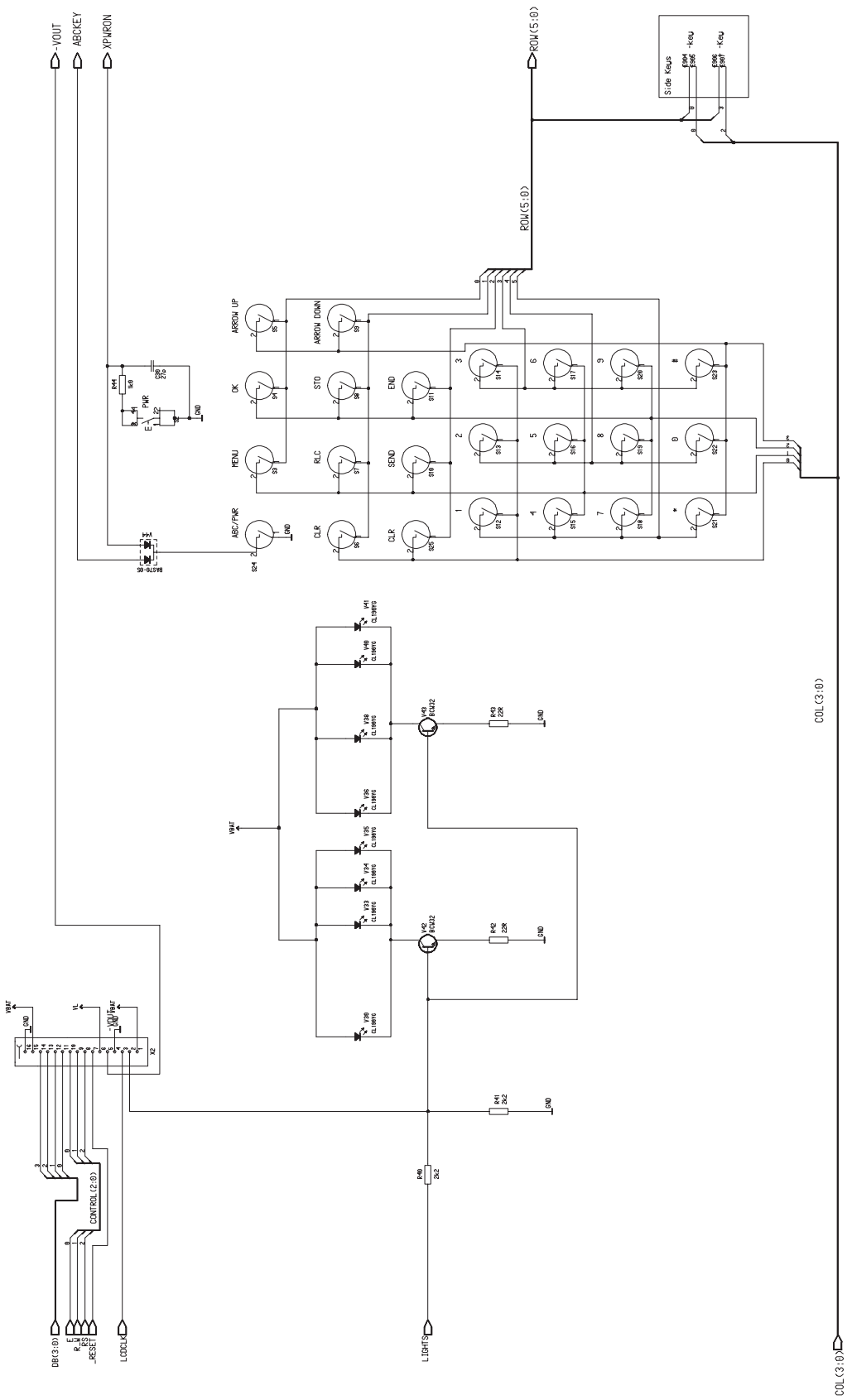
JR4: Circuit Diagram of Power Supply (Version:12 Edit:128)



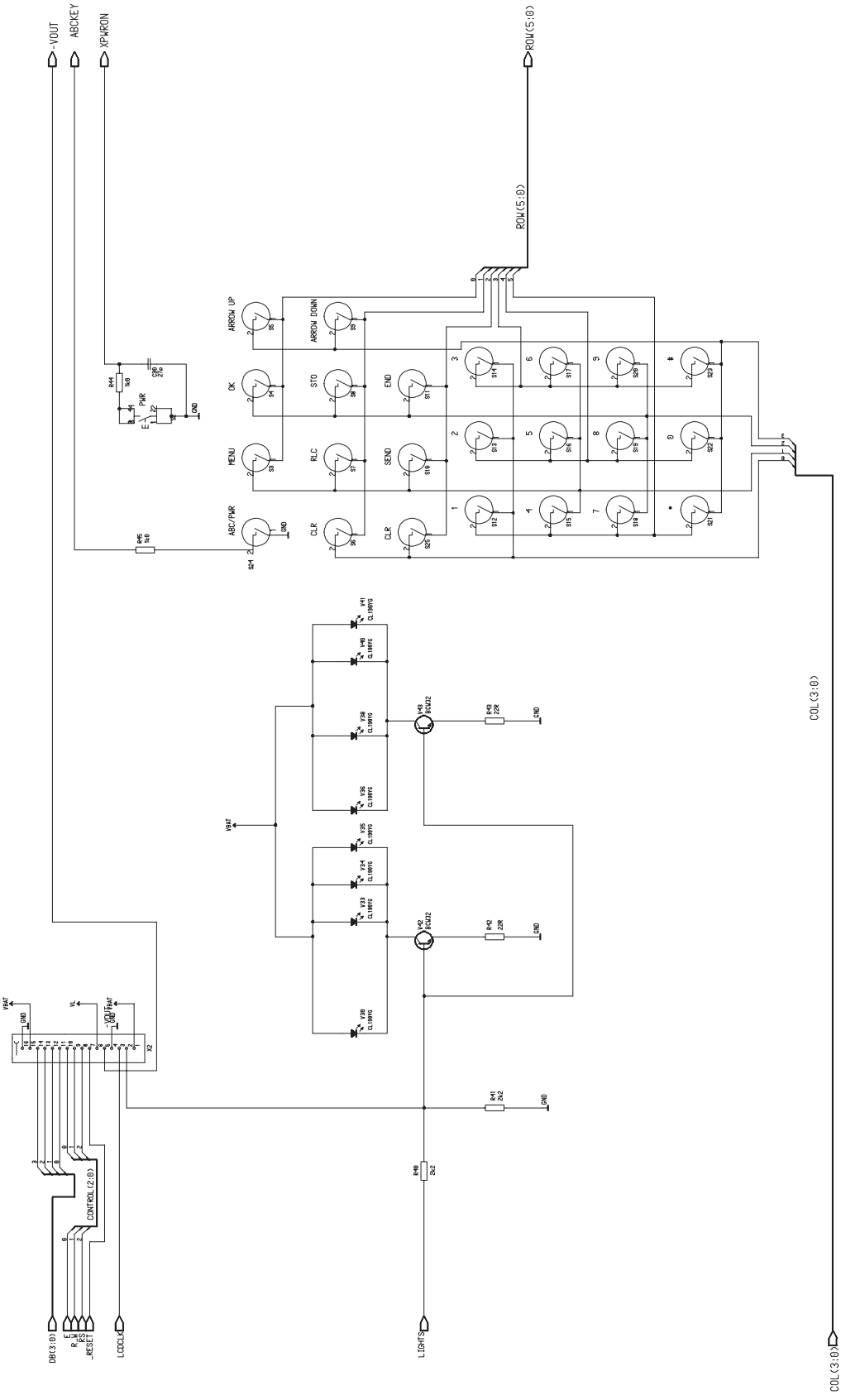
JR4: Circuit Diagram of Power Supply (Version:13 Edit:129)



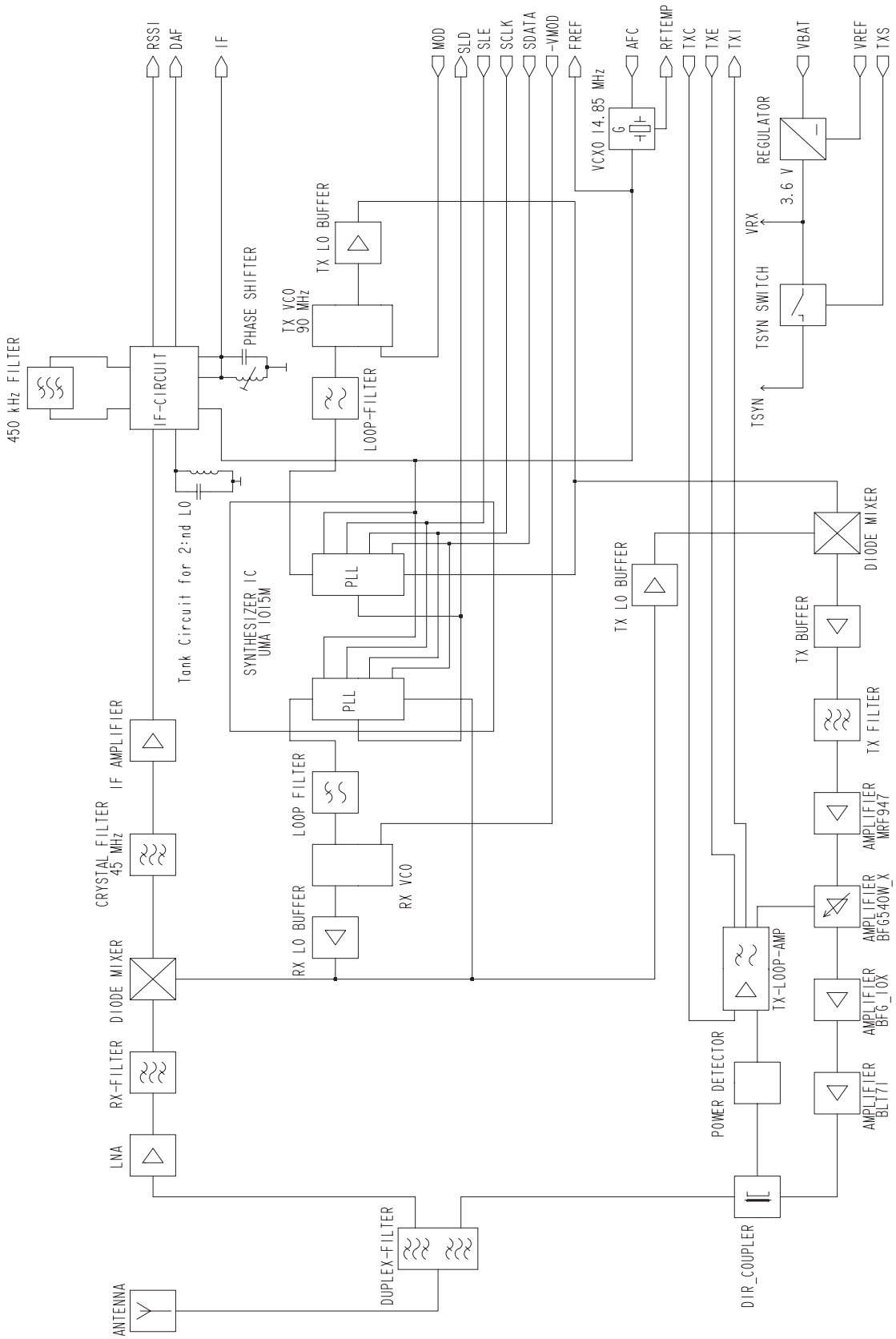
JR4: Circuit Diagram of User Interface (Version:12 Edit: 89)



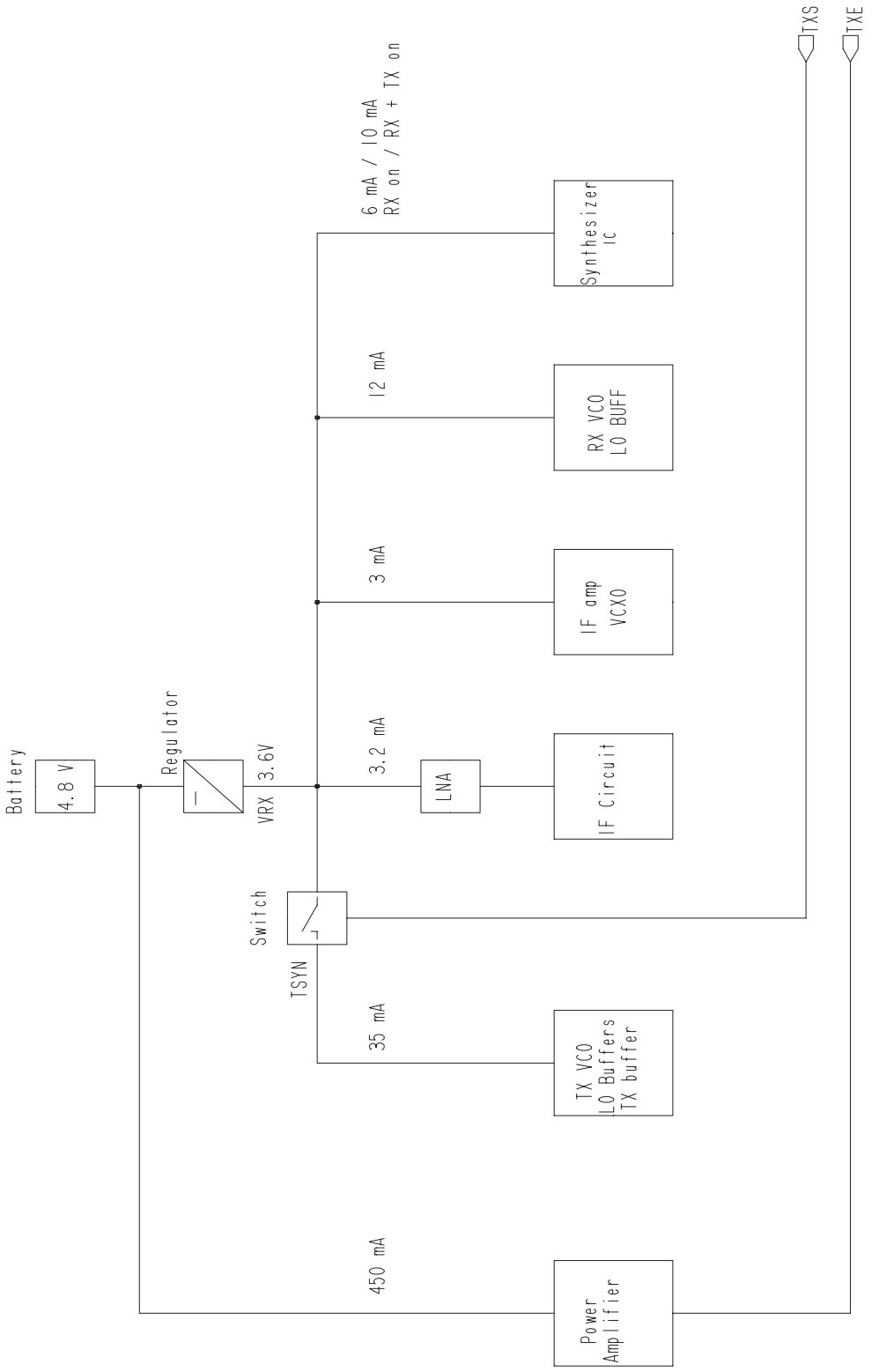
JR4: Circuit Diagram of User Interface (Version:13 Edit:89)



Block Diagram of RF Section



Power Distribution Diagram of RF Section



JR4: Circuit Diagram of RF Section (version 12)

JR4: Circuit Diagram of RF Section (version 13)

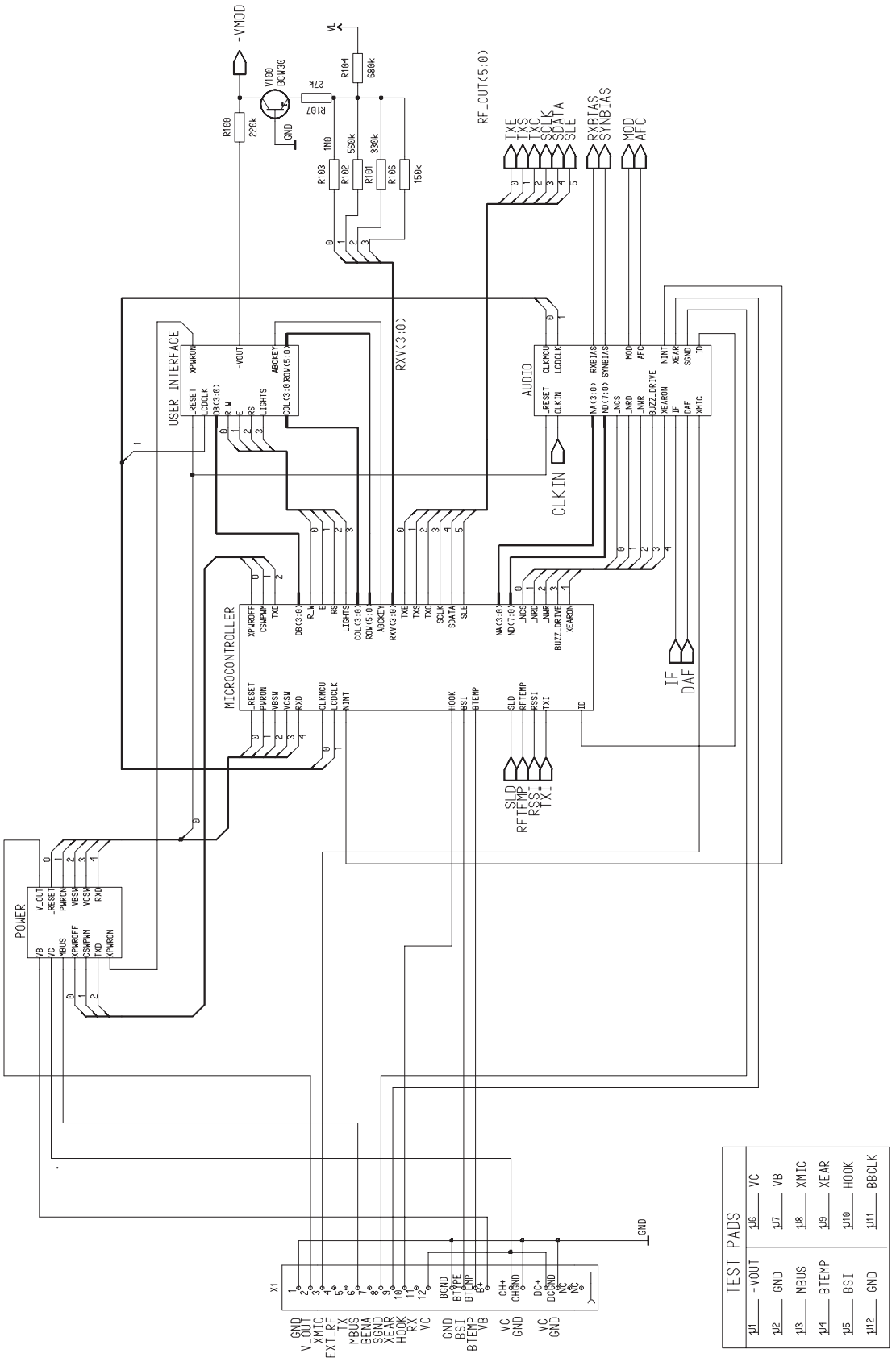
JR7: Circuit Diagram of RF Section (version 13)

JR4: Layout Diagrams (version 12)

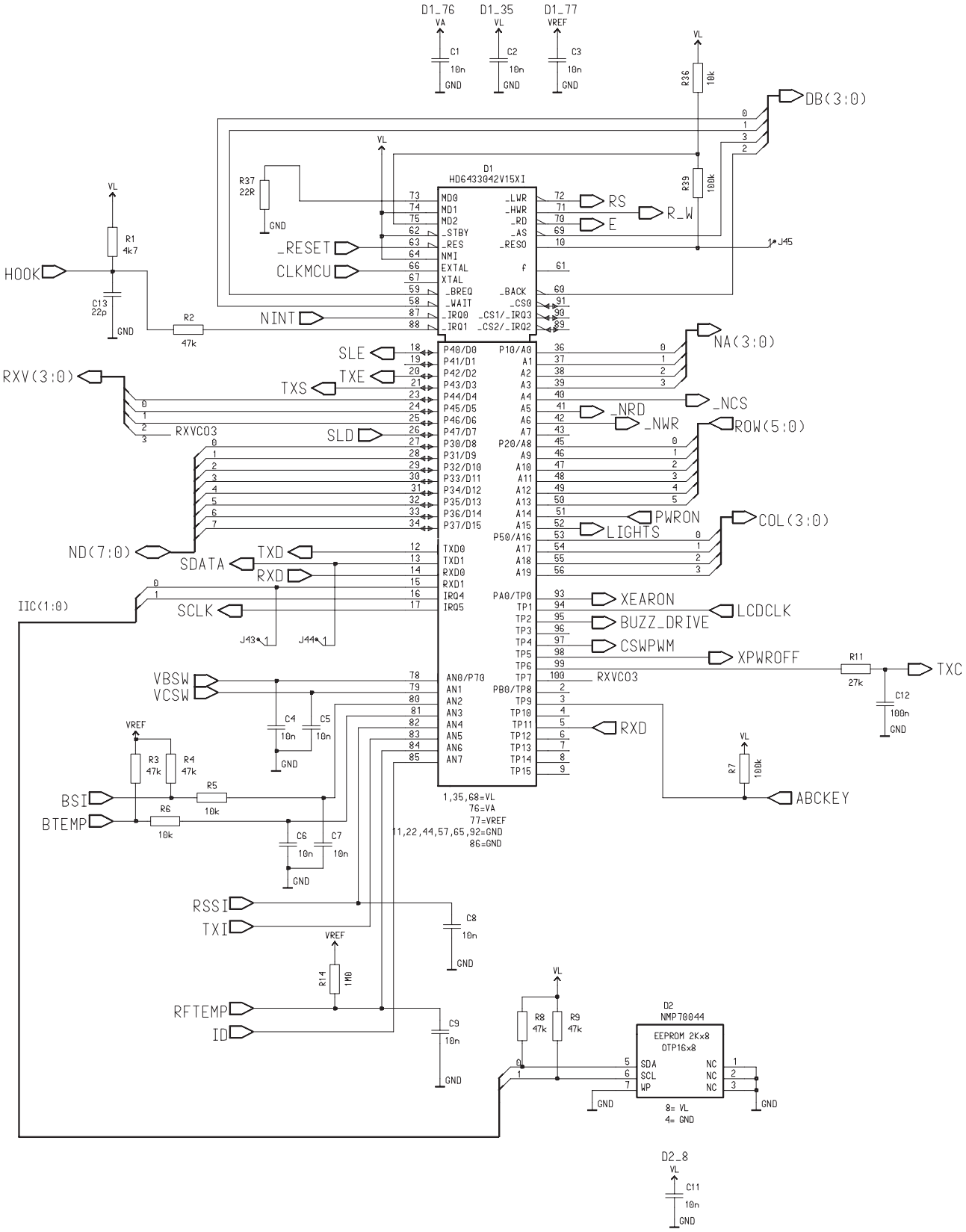
JR4: Layout Diagrams (version 13)

JR7: Layout Diagrams (version 13)

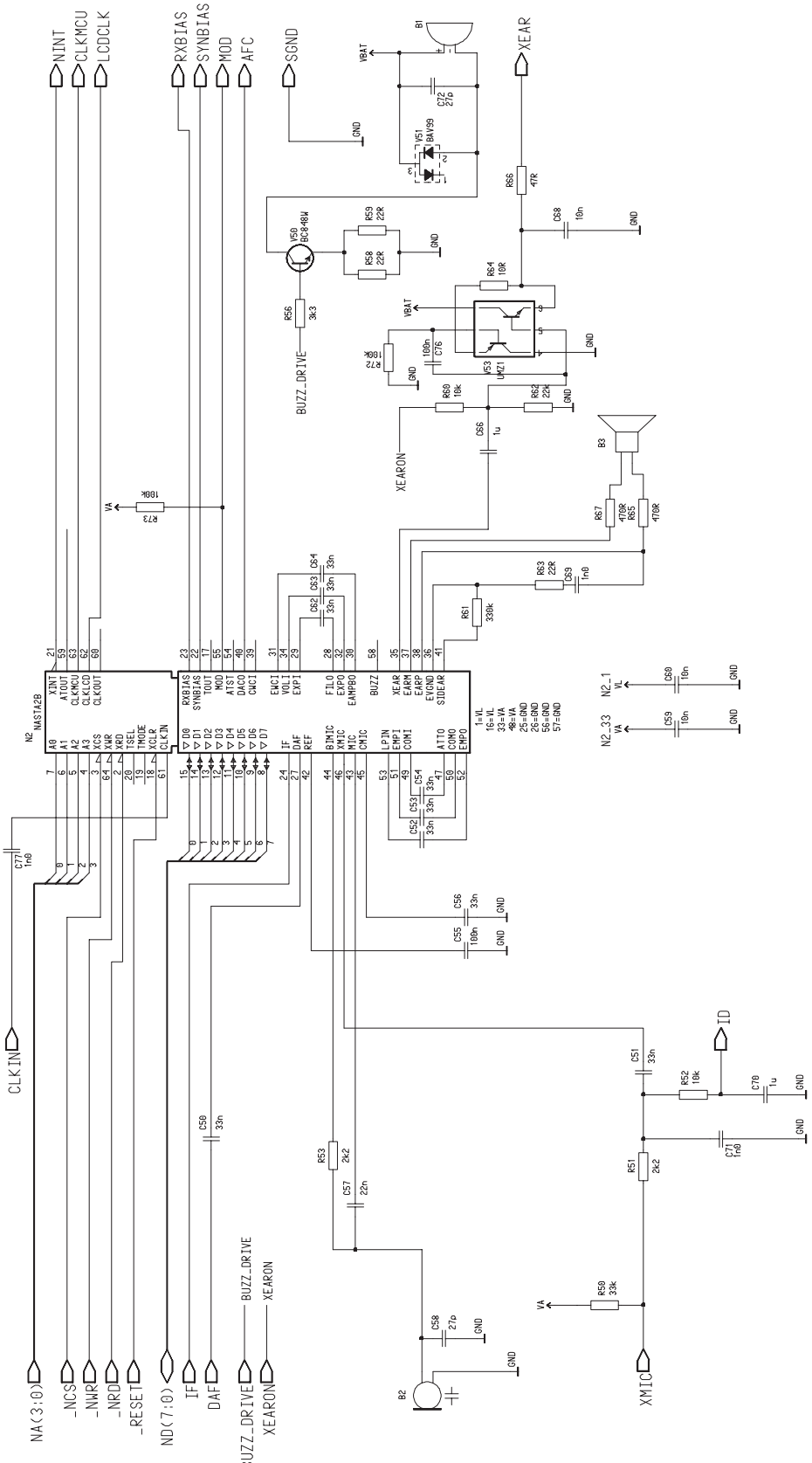
JR7: Circuit Diagram of Baseband Section (Version:13 Edit:140)



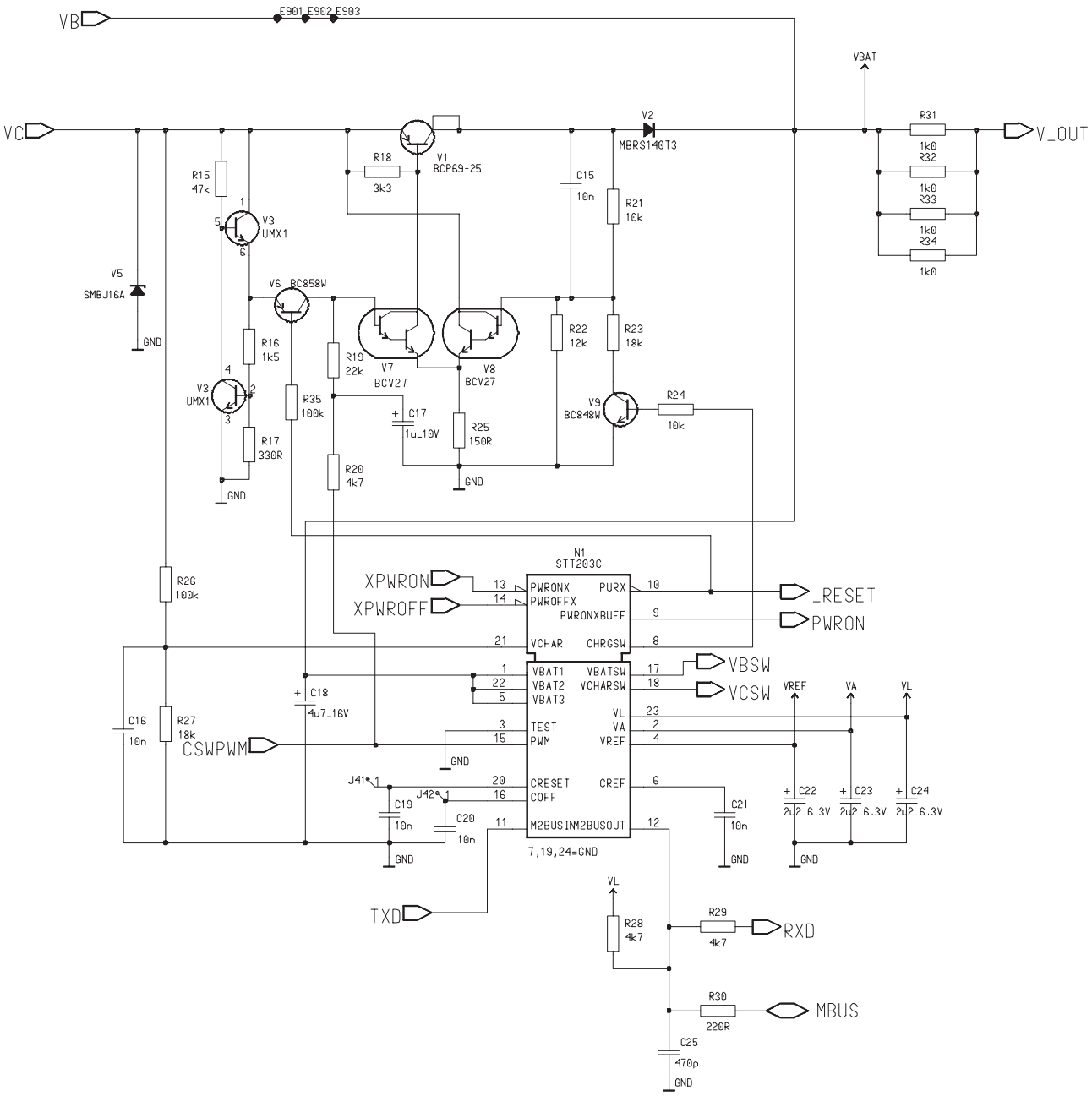
JR7: Circuit Diagram of MCU & EEPROM (Version:13 Edit: 98)



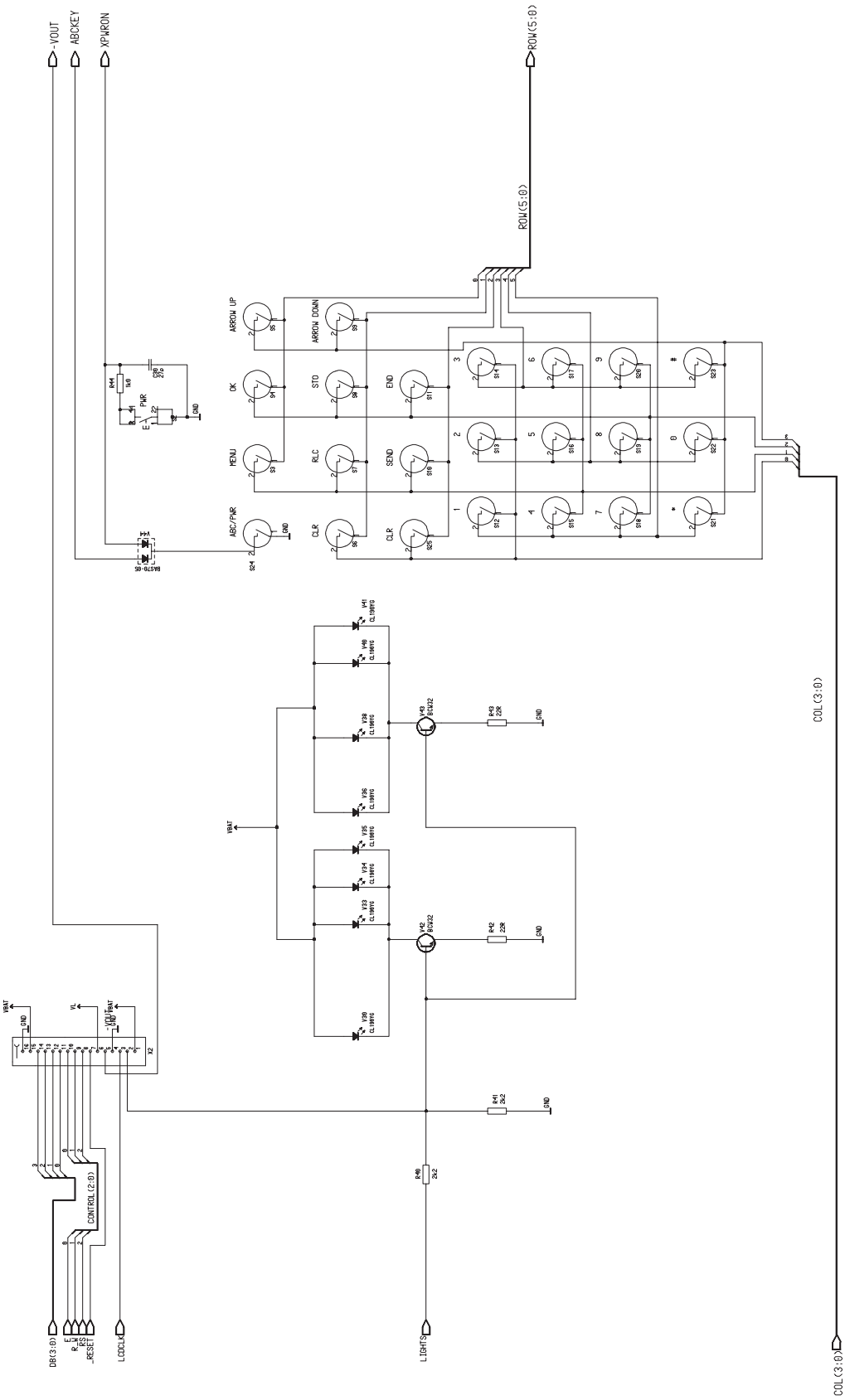
JR7: Circuit Diagram of Audio (Version:13 Edit: 159)



JR7: Circuit Diagram of Power Supply (Version:13 Edit:129)



JR7: Circuit Diagram of User Interface (Version:13 Edit: 89)



Part List of JR4 (Code: 0200613, Issue: 9.12)

ITEM	CODE	DESCRIPTION	VALUE	TYPE
R001	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R002	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R003	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R004	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R005	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R006	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R007	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R008	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R009	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R011	1430790	Chip resistor	27 k	5 % 0.063 W 0402
R014	1430830	Chip resistor	1.0 M	5 % 0.063 W 0402
R015	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R016	1430758	Chip resistor	1.5 k	5 % 0.063 W 0402
R017	1430740	Chip resistor	330	5 % 0.063 W 0402
R018	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R019	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R020	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R021	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R022	1430780	Chip resistor	12 k	5 % 0.063 W 0402
R023	1430786	Chip resistor	18 k	5 % 0.063 W 0402
R024	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R025	1430730	Chip resistor	150	5 % 0.063 W 0402
R026	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R027	1430786	Chip resistor	18 k	5 % 0.063 W 0402
R028	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R029	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R030	1430734	Chip resistor	220	5 % 0.063 W 0402
R031	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R032	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R033	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R034	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R035	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R036	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R040	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R041	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R042	1430710	Chip resistor	22	5 % 0.063 W 0402
R043	1430710	Chip resistor	22	5 % 0.063 W 0402
R044	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R045	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R050	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R051	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R052	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R053	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402

R054	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R056	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R058	1430710	Chip resistor	22	5 % 0.063 W 0402
R059	1430710	Chip resistor	22	5 % 0.063 W 0402
R060	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R061	1430816	Chip resistor	330 k	5 % 0.063 W 0402
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R063	1430710	Chip resistor	22	5 % 0.063 W 0402
R064	1430700	Chip resistor	10	5 % 0.063 W 0402
R065	1430744	Chip resistor	470	5 % 0.063 W 0402
R066	1430718	Chip resistor	47	5 % 0.063 W 0402
R067	1430744	Chip resistor	470	5 % 0.063 W 0402
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R103	1430830	Chip resistor	1.0 M	5 % 0.063 W 0402
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R600	1430726	Chip resistor	100	5 % 0.063 W 0402
R601	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R602	1430804	Chip resistor	100 k	5 % 0.063 W 0402
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R605	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402
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R607	1430726	Chip resistor	100	5 % 0.063 W 0402
R608	1430776	Chip resistor	8.2 k	5 % 0.063 W 0402
R609	1430720	Chip resistor	56	5 % 0.063 W 0402
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R611	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R612	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R613	1430728	Chip resistor	120	5 % 0.063 W 0402
R614	1430718	Chip resistor	47	5 % 0.063 W 0402
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R622	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R623	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R624	1430718	Chip resistor	47	5 % 0.063 W 0402
R625	1430722	Chip resistor	68	5 % 0.063 W 0402
R626	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402
R627	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402

R628	1430700	Chip resistor	10	5 % 0.063 W 0402
R629	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402
R630	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402
R631	1430710	Chip resistor	22	5 % 0.063 W 0402
R632	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R633	1430740	Chip resistor	330	5 % 0.063 W 0402
R635	1430714	Chip resistor	33	5 % 0.063 W 0402
R636	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R637	1430714	Chip resistor	33	5 % 0.063 W 0402
R639	1430742	Chip resistor	390	5 % 0.063 W 0402
R640	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R641	1430726	Chip resistor	100	5 % 0.063 W 0402
R644	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R645	1430700	Chip resistor	10	5 % 0.063 W 0402
R646	1430710	Chip resistor	22	5 % 0.063 W 0402
R647	1430710	Chip resistor	22	5 % 0.063 W 0402
R652	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R653	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R654	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R656	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R659	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R660	1430700	Chip resistor	10	5 % 0.063 W 0402
R663	1430722	Chip resistor	68	5 % 0.063 W 0402
R664	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R667	1430748	Chip resistor	680	5 % 0.063 W 0402
R668	1430718	Chip resistor	47	5 % 0.063 W 0402
R669	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R670	1430742	Chip resistor	390	5 % 0.063 W 0402
R671	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R672	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R673	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R674	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R675	1430700	Chip resistor	10	5 % 0.063 W 0402
R681	1430726	Chip resistor	100	5 % 0.063 W 0402
R683	1430802	Chip resistor	82 k	5 % 0.063 W 0402
R700	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R701	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R702	1430700	Chip resistor	10	5 % 0.063 W 0402
R703	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R705	1430726	Chip resistor	100	5 % 0.063 W 0402
R710	1430774	Chip resistor	6.8 k	5 % 0.063 W 0402
R712	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R713	1430784	Chip resistor	15 k	5 % 0.063 W 0402
R714	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R715	1430758	Chip resistor	1.5 k	5 % 0.063 W 0402
R716	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R717	1430700	Chip resistor	10	5 % 0.063 W 0402
R718	1430700	Chip resistor	10	5 % 0.063 W 0402

R721	1430724	Chip resistor	82	5 % 0.063 W 0402
R801	1430724	Chip resistor	82	5 % 0.063 W 0402
R804	1430734	Chip resistor	220	5 % 0.063 W 0402
R805	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R806	1430746	Chip resistor	560	5 % 0.063 W 0402
R807	1430700	Chip resistor	10	5 % 0.063 W 0402
R808	1430718	Chip resistor	47	5 % 0.063 W 0402
R809	1430700	Chip resistor	10	5 % 0.063 W 0402
R810	1430718	Chip resistor	47	5 % 0.063 W 0402
R811	1430700	Chip resistor	10	5 % 0.063 W 0402
R813	1430700	Chip resistor	10	5 % 0.063 W 0402
R814	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R815	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R816	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R817	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R818	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R819	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R820	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R821	1430772	Chip resistor	5.6 k	5 % 0.063 W 0402
R823	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R824	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R825	1430710	Chip resistor	22	5 % 0.063 W 0402
R901	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R902	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R903	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R904	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R906	1430778	Chip resistor	10 k	5 % 0.063 W 0402
C001	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C002	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C003	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C004	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C005	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C006	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C007	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C008	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C009	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C011	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C012	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C013	2320544	Ceramic cap.	22 p	5 % 50 V 0402
C015	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C016	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C017	2610100	Tantalum cap.	1R001	1430770 Chip resistor
4.7 k	5 % 0.063 W 0402			
R002	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R003	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R004	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R005	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R006	1430778	Chip resistor	10 k	5 % 0.063 W 0402

R007	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R008	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R009	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R011	1430790	Chip resistor	27 k	5 % 0.063 W 0402
R014	1430830	Chip resistor	1.0 M	5 % 0.063 W 0402
R015	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R016	1430758	Chip resistor	1.5 k	5 % 0.063 W 0402
R017	1430740	Chip resistor	330	5 % 0.063 W 0402
R018	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R019	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R020	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R021	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R022	1430780	Chip resistor	12 k	5 % 0.063 W 0402
R023	1430786	Chip resistor	18 k	5 % 0.063 W 0402
R024	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R025	1430730	Chip resistor	150	5 % 0.063 W 0402
R026	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R027	1430786	Chip resistor	18 k	5 % 0.063 W 0402
R028	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R029	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R030	1430734	Chip resistor	220	5 % 0.063 W 0402
R031	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R032	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R033	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R034	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R035	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R036	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R040	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R041	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R042	1430710	Chip resistor	22	5 % 0.063 W 0402
R043	1430710	Chip resistor	22	5 % 0.063 W 0402
R044	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R045	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R050	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R051	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R052	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R053	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R054	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R056	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R058	1430710	Chip resistor	22	5 % 0.063 W 0402
R059	1430710	Chip resistor	22	5 % 0.063 W 0402
R060	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R061	1430816	Chip resistor	330 k	5 % 0.063 W 0402
R062	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R063	1430710	Chip resistor	22	5 % 0.063 W 0402
R064	1430700	Chip resistor	10	5 % 0.063 W 0402
R065	1430744	Chip resistor	470	5 % 0.063 W 0402
R066	1430718	Chip resistor	47	5 % 0.063 W 0402

R067	1430744	Chip resistor		470	5 % 0.063 W 0402
R071	1430804	Chip resistor		100 k	5 % 0.063 W 0402
R072	1430804	Chip resistor		100 k	5 % 0.063 W 0402
R073	1430804	Chip resistor		100 k	5 % 0.063 W 0402
R100	1430812	Chip resistor		220 k	5 % 0.063 W 0402
R101	1430816	Chip resistor		330 k	5 % 0.063 W 0402
R102	1430822	Chip resistor		560 k	5 % 0.063 W 0402
R103	1430830	Chip resistor		1.0 M	5 % 0.063 W 0402
R104	1430826	Chip resistor		680 k	5 % 0.063 W 0402
R106	1430808	Chip resistor		150 k	5 % 0.063 W 0402
R107	1430790	Chip resistor		27 k	5 % 0.063 W 0402
R600	1430726	Chip resistor		100	5 % 0.063 W 0402
R601	1430804	Chip resistor		100 k	5 % 0.063 W 0402
R602	1430804	Chip resistor		100 k	5 % 0.063 W 0402
R604	1430710	Chip resistor		22	5 % 0.063 W 0402
R605	1430832	Chip resistor		2.7 k	5 % 0.063 W 0402
R606	1430724	Chip resistor		82	5 % 0.063 W 0402
R607	1430726	Chip resistor		100	5 % 0.063 W 0402
R608	1430776	Chip resistor		8.2 k	5 % 0.063 W 0402
R609	1430720	Chip resistor		56	5 % 0.063 W 0402
R610	1430762	Chip resistor		2.2 k	5 % 0.063 W 0402
R611	1430762	Chip resistor		2.2 k	5 % 0.063 W 0402
R612	1430764	Chip resistor		3.3 k	5 % 0.063 W 0402
R613	1430728	Chip resistor		120	5 % 0.063 W 0402
R614	1430718	Chip resistor		47	5 % 0.063 W 0402
R615	1430798	Chip resistor		56 k	5 % 0.063 W 0402
R616	1430700	Chip resistor		10	5 % 0.063 W 0402
R617	1430746	Chip resistor		560	5 % 0.063 W 0402
R619	1430774	Chip resistor		6.8 k	5 % 0.063 W 0402
R620	1430796	Chip resistor		47 k	5 % 0.063 W 0402
R621	1430778	Chip resistor		10 k	5 % 0.063 W 0402
R622	1430778	Chip resistor		10 k	5 % 0.063 W 0402
R623	1430778	Chip resistor		10 k	5 % 0.063 W 0402
R624	1430718	Chip resistor		47	5 % 0.063 W 0402
R625	1430722	Chip resistor		68	5 % 0.063 W 0402
R626	1430832	Chip resistor		2.7 k	5 % 0.063 W 0402
R627	1430762	Chip resistor		2.2 k	5 % 0.063 W 0402
R628	1430700	Chip resistor		10	5 % 0.063 W 0402
R629	1430832	Chip resistor		2.7 k	5 % 0.063 W 0402
R630	1430832	Chip resistor		2.7 k	5 % 0.063 W 0402
R631	1430710	Chip resistor		22	5 % 0.063 W 0402
R632	1430804	Chip resistor		100 k	5 % 0.063 W 0402
R633	1430740	Chip resistor		330	5 % 0.063 W 0402
R635	1430714	Shipres 0w06 33r j	0402		0402
R636	1430754	Chip resistor		1.0 k	5 % 0.063 W 0402
R637	1430714	Shipres 0w06 33r j	0402		0402
R639	1430742	Chip resistor		390	5 % 0.063 W 0402
R640	1430778	Chip resistor		10 k	5 % 0.063 W 0402

R641	1430726	Chip resistor	100	5 % 0.063 W 0402
R644	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R645	1430700	Chip resistor	10	5 % 0.063 W 0402
R646	1430710	Chip resistor	22	5 % 0.063 W 0402
R647	1430710	Chip resistor	22	5 % 0.063 W 0402
R652	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R653	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R654	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R656	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R659	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R660	1430700	Chip resistor	10	5 % 0.063 W 0402
R663	1430722	Chip resistor	68	5 % 0.063 W 0402
R664	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R667	1430748	Chip resistor	680	5 % 0.063 W 0402
R668	1430718	Chip resistor	47	5 % 0.063 W 0402
R669	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R670	1430742	Chip resistor	390	5 % 0.063 W 0402
R671	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R672	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R673	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R674	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R675	1430700	Chip resistor	10	5 % 0.063 W 0402
R681	1430726	Chip resistor	100	5 % 0.063 W 0402
R683	1430802	Chip resistor	82 k	5 % 0.063 W 0402
R700	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R701	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R702	1430700	Chip resistor	10	5 % 0.063 W 0402
R703	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R705	1430726	Chip resistor	100	5 % 0.063 W 0402
R710	1430774	Chip resistor	6.8 k	5 % 0.063 W 0402
R712	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R713	1430784	Chip resistor	15 k	5 % 0.063 W 0402
R714	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R715	1430758	Chip resistor	1.5 k	5 % 0.063 W 0402
R716	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R717	1430700	Chip resistor	10	5 % 0.063 W 0402
R718	1430700	Chip resistor	10	5 % 0.063 W 0402
R721	1430724	Chip resistor	82	5 % 0.063 W 0402
R801	1430724	Chip resistor	82	5 % 0.063 W 0402
R804	1430734	Chip resistor	220	5 % 0.063 W 0402
R805	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R806	1430746	Chip resistor	560	5 % 0.063 W 0402
R807	1430700	Chip resistor	10	5 % 0.063 W 0402
R808	1430718	Chip resistor	47	5 % 0.063 W 0402
R809	1430700	Chip resistor	10	5 % 0.063 W 0402
R810	1430718	Chip resistor	47	5 % 0.063 W 0402
R811	1430700	Chip resistor	10	5 % 0.063 W 0402
R813	1430700	Chip resistor	10	5 % 0.063 W 0402

R814	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R815	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R816	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R817	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R818	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R819	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R820	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R821	1430772	Chip resistor	5.6 k	5 % 0.063 W 0402
R823	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R824	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R825	1430710	Chip resistor	22	5 % 0.063 W 0402
R901	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R902	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R903	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R904	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R906	1430778	Chip resistor	10 k	5 % 0.063 W 0402
C001	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C002	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C003	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C004	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C005	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C006	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C007	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C008	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C009	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C011	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C012	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C013	2320544	Ceramic cap.	22 p	5 % 50 V 0402
C015	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C016	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C017	2610100	Tantalum cap.	1 u	20 % 10 V 2.0x1.3x1.2
C018	2604456	Tantalum cap.	4.7 u	20 % 16 V 4.7x2.6x2.1
C019	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C020	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C021	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C022	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C023	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C024	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C025	2320576	Ceramic cap.	470 p	5 % 50 V 0402
C030	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C050	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C051	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C052	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C053	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C054	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C055	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C056	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C057	2310777	Ceramic cap.	22 n	20 % 50 V 0805

C058	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C059	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C060	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C062	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C063	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C064	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C066	2312410	Ceramic cap.	1.0 u	10 % 16 V 1206
C068	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C069	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C070	2312410	Ceramic cap.	1.0 u	10 % 16 V 1206
C071	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C072	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C076	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C077	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C600	2320520	Ceramic cap.	2.2 p	0.25 % 50 V 0402
C601	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C602	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C603	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C604	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C605	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C606	2320602	Ceramic cap.	4.7 p	0.25 % 50 V 0402
C607	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C608	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C609	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C610	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C611	2320538	Ceramic cap.	12 p	5 % 50 V 0402
C612	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C613	2320520	Ceramic cap.	2.2 p	0.25 % 50 V 0402
C614	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C616	2310769	Ceramic cap.	15 n	20 % 50 V 0805
C617	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C618	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C619	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C620	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C621	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C622	2320544	Ceramic cap.	22 p	5 % 50 V 0402
C623	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C624	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C625	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C627	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C628	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C629	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C630	2320554	Ceramic cap.	56 p	5 % 50 V 0402
C631	2320556	Ceramic cap.	68 p	5 % 50 V 0402
C632	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C633	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C634	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C635	2320534	Ceramic cap.	8.2 p	0.25 % 50 V 0402

C636	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C637	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C638	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C639	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C640	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C641	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C642	2320602	Ceramic cap.	4.7 p	0.25 % 50 V 0402
C643	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C644	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C654	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C655	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C656	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C657	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C658	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C659	2320556	Ceramic cap.	68 p	5 % 50 V 0402
C660	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C662	2320602	Ceramic cap.	4.7 p	0.25 % 50 V 0402
C663	2320576	Ceramic cap.	470 p	5 % 50 V 0402
C665	2310780	Ceramic cap.	68 n	10 % 25 V 0805
C669	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C670	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C671	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C675	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C676	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C677	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C678	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C679	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C680	2610016	Tantalum cap.	0.47 u	10 % 25 V 3.2x1.6x1.6
C681	2320552	Ceramic cap.	47 p	5 % 50 V 0402
C682	2320552	Ceramic cap.	47 p	5 % 50 V 0402
C683	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C686	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C690	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C691	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C701	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C702	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C703	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C704	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C705	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C706	2320540	Ceramic cap.	15 p	5 % 50 V 0402
C709	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C712	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C714	2320534	Ceramic cap.	8.2 p	0.25 % 50 V 0402
C715	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C716	2320520	Ceramic cap.	2.2 p	0.25 % 50 V 0402
C718	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C719	2320544	Ceramic cap.	22 p	5 % 50 V 0402
C720	2312410	Ceramic cap.	1.0 u	10 % 16 V 1206

C721	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C722	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C723	2310490	Ceramic cap.	360 p	2 % 50 V 0805
C725	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C726	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C727	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C728	2320594	Ceramic cap.	2.7 n	5 % 50 V 0402
C729	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C730	2320592	Ceramic cap.	2.2 n	5 % 50 V 0402
C734	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C735	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C736	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C737	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C749	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C801	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C802	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C804	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C805	2320530	Ceramic cap.	5.6 p	0.25 % 50 V 0402
C806	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C807	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C808	2320540	Ceramic cap.	15 p	5 % 50 V 0402
C810	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C811	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C813	2320530	Ceramic cap.	5.6 p	0.25 % 50 V 0402
C815	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C816	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C818	2604456	Tantalum cap.	4.7 u	20 % 16 V 4.7x2.6x2.1
C820	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C822	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C824	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C825	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C826	2310752	Ceramic cap.	10 n	20 % 50 V 0805
C827	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C828	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C830	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C831	2320522	Ceramic cap.	2.7 p	0.25 % 50 V 0402
C834	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C835	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C839	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C840	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C901	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C904	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C905	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C906	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C907	2320548	Ceramic cap.	33 p	5 % 50 V 0402
L601	3641574	Chip coil	68 n	5 % Q=40 0805
L602	3641574	Chip coil	68 n	5 % Q=40 0805
L603	3641574	Chip coil	68 n	5 % Q=40 0805

L604	3641574	Chip coil	68 n	5 % Q=40 0805
L605	3641574	Chip coil	68 n	5 % Q=40 0805
L651	3641548	Chip coil	100 n	10 % Q=40 0805
L653	3641574	Chip coil	68 n	5 % Q=40 0805
L702	3608439	Chip coil	820 n	5 % 1206
L704	3660102	Coil adj.	320 u	2 % Q=80
L705	3608439	Chip coil	820 n	5 % 1206
L706	3608502	Chip coil	1 u	5 % 1206
L709	3608365	Chip coil	100 u	5 % Q=18 3.2x2.5
L710	3641302	Chip coil	470 n	5 % 1008
L801	3641262	Ferrite bead 30 Ω/100 MHz 2 A		1206
G600	4350005	VCXO 14.85 MHz ±20 ppm 3 V 6–3% 2 mA		
Z692	4511083	SM, saw bpf 836.5 MHz ±12.5 MHz		AMPS
Z700	4512051	SM, dupl.hc 824–849/869–894 MHz		AMPS
Z702	4513060	SM, xtal bpf 45 MHz ±15 kHz/3 dB		TR6
Z703	4550102	SM, ceramic filterer 869–894 MHz		9.3x7.6
Z704	4556922	Cer. filter		L2.2
V001	4210020	Transistor	BCP69–25	pnp 20 V 2 A SOT223
V002	4110034	Schottky diode	MBRS140	40 V 1 A DO214AA
V003	4219904	Transistor x 2	UMX1	npn 40 V SOT363
V005	4110028	Trans. supr.	16V	23 A 600 W DO214AA
V006	4210102	Transistor	BC858W	pnp 30 V 100 mA SOT323
V007	4200226	Darl. transistor	BCV27	npn 30 V 300 mA SOT23
V008	4200226	Darl. transistor	BCV27	npn 30 V 300 mA SOT23
V009	4210100	Transistor	BC848W	npn 30 V SOT323
V030	4864388	Led	Green	0603
V031	4864388	Led	Green	0603
V032	4864388	Led	Green	0603
V033	4864388	Led	Green	0603
V034	4864388	Led	Green	0603
V035	4864388	Led	Green	0603
V036	4864388	Led	Green	0603
V037	4864388	Led	Green	0603
V038	4864388	Led	Green	0603
V039	4864388	Led	Green	0603
V040	4864388	Led	Green	0603
V041	4864388	Led	Green	0603
V042	4200917	Transistor	BC848B/BCW32	npn 30 V 100 mA SOT23
V043	4200917	Transistor	BC848B/BCW32	npn 30 V 100 mA SOT23
V044	4100189	Schottky diode	BAS70–05	70 V 15 mA SOT23
V050	4210100	Transistor	BC848W	npn 30 V SOT323
V051	4100285	Diode x 2	BAV99	70 V 200 mA SER.SOT23
V053	4219922	Transistor x 2	UMZ1	n&p 40 V 0.1 A UM6
V100	4200909	Transistor	BC858B/BCW30	pnp 30 V 100 mA SOT23
V601	4210132	Transistor	NE68130	npn 10 V 65 mA SOT323
V602	4210132	Transistor	NE68130	npn 10 V 65 mA SOT323
V603	4110018	Cap. diode	BB135	30 V SOD323
V604	4219922	Transistor x 2	UMZ1	n&p 40 V 0.1 A UM6

V605	4100260	Diode x 2	BAW56	70 V 200 mA SOT23
V651	4210102	Transistor	BC858W	pnp 30 V 100 mA SOT323
V654	4210100	Transistor	BC848W	npn 30 V SOT323
V655	4100567	Sch. diode x 2	BAS70–04	70V15 mA SERSOT23
V657	4210066	Transistor	BFR93AW	npn 12 V 35 mA SOT323
V658	4210079	Transistor	BFS17	npn 15 V 50 mA SOT23
V659	4104951	Cap. diode x 2	BBY39	SOT23
V660	4210058	Transistor	MRF947	npn 10 V 50 mA SOT323
V661	4210132	Transistor	NE68130	npn 10 V 65 mA SOT323
V662	4210058	Transistor	MRF947	npn 10 V 50 mA SOT323
V700	4210004	Transistor	BFG67X	npn 20 V 50 mA 7SOT143
V701	4115802	Sch. diode x 2	4V	30 mA SOT23
V703	4210066	Transistor	BFR93AW	npn 12 V 35 mA SOT323
V801	4100567	Sch. diode x 2	BAS70–04	70 V 15 mA SERSOT23
V803	4210091	Transistor	BFG540W/X	npn 15 V SOT343
V804	4210133	Transistor	BFG10W/X	npn 10 V 0.25 A SOT343
V805	4210072	Transistor	BLT71	npn 8V V 0.5 A SOT223
V807	4210054	Transistor	FMMT589	pnp 30 V 1 A SOT23
V808	4219922	Transistor x 2	UMZ1	n&p 40 V 0.1 A UM6
V809	4219904	Transistor x 2	UMX1	npn 40 V SOT363
V810	4210102	Transistor	BC858W	pnp 30 V 100 mA SOT323
V901	4210054	Transistor	FMMT589	pnp 30 V 1 A SOT23
V902	4219904	Transistor x 2	UMX1	npn 40 V SOT363
D001	4340191	IC, MCU		
D002	4370044	IC, EEPROM	NMP70044	SO8S
N001	4370084	IC, STT203C muumi	NMP70084	VSOP24
N002	4375062	IC, nasta3 MAS1006B	NMP75062	TQFP64
N650	4349616	IC, 2xsynth 1.1 GHz 3 V	UMA1015M	SSO20
N700	4349694	IC, IF amp+FM detector	TA31136	SSO16
S002	5200120	Push button switch 6.4x5.2		smd
X001	5469001	System connector for dct2 product		PRODUCT
X002	5449078	SM, conn pcb/pcb 16 pol f		PITCH0.8MM
X701	9510248	Antenna clip		4D25100 NHA–2NA
	9854046	PCB JRX1 46.0X152.0X1.0 M4 2/PA		
	9854046	PC board	JRX1	46.0x152.0x1.0 m4 2/pa

Part List of JR4 (Code: 0200613, Issue: 13.0)

ITEM	CODE	DESCRIPTION	VALUE	TYPE
R001	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R002	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R003	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R004	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R005	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R006	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R007	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R008	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R009	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R011	1430790	Chip resistor	27 k	5 % 0.063 W 0402
R014	1430830	Chip resistor	1.0 M	5 % 0.063 W 0402
R015	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R016	1430758	Chip resistor	1.5 k	5 % 0.063 W 0402
R017	1430740	Chip resistor	330	5 % 0.063 W 0402
R018	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R019	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R020	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R021	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R022	1430780	Chip resistor	12 k	5 % 0.063 W 0402
R023	1430786	Chip resistor	18 k	5 % 0.063 W 0402
R024	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R025	1430730	Chip resistor	150	5 % 0.063 W 0402
R026	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R027	1430786	Chip resistor	18 k	5 % 0.063 W 0402
R028	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R029	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R030	1430734	Chip resistor	220	5 % 0.063 W 0402
R031	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R032	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R033	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R034	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R035	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R036	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R037	1430710	Chip resistor	22	5 % 0.063 W 0402
R039	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R040	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R041	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R042	1430710	Chip resistor	22	5 % 0.063 W 0402
R043	1430710	Chip resistor	22	5 % 0.063 W 0402
R044	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R045	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R050	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R051	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402

R052	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R053	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R056	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R058	1430710	Chip resistor	22	5 % 0.063 W 0402
R059	1430710	Chip resistor	22	5 % 0.063 W 0402
R060	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R061	1430816	Chip resistor	330 k	5 % 0.063 W 0402
R062	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R063	1430710	Chip resistor	22	5 % 0.063 W 0402
R064	1430700	Chip resistor	10	5 % 0.063 W 0402
R065	1430744	Chip resistor	470	5 % 0.063 W 0402
R066	1430718	Chip resistor	47	5 % 0.063 W 0402
R067	1430744	Chip resistor	470	5 % 0.063 W 0402
R072	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R073	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R100	1430812	Chip resistor	220 k	5 % 0.063 W 0402
R101	1430816	Chip resistor	330 k	5 % 0.063 W 0402
R102	1430822	Chip resistor	560 k	5 % 0.063 W 0402
R103	1430830	Chip resistor	1.0 M	5 % 0.063 W 0402
R104	1430826	Chip resistor	680 k	5 % 0.063 W 0402
R106	1430808	Chip resistor	150 k	5 % 0.063 W 0402
R107	1430790	Chip resistor	27 k	5 % 0.063 W 0402
R600	1430726	Chip resistor	100	5 % 0.063 W 0402
R604	1430710	Chip resistor	22	5 % 0.063 W 0402
R605	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402
R606	1430724	Chip resistor	82	5 % 0.063 W 0402
R607	1430726	Chip resistor	100	5 % 0.063 W 0402
R608	1430776	Chip resistor	8.2 k	5 % 0.063 W 0402
R609	1430720	Chip resistor	56	5 % 0.063 W 0402
R610	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R611	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R612	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R613	1430728	Chip resistor	120	5 % 0.063 W 0402
R614	1430718	Chip resistor	47	5 % 0.063 W 0402
R615	1430798	Chip resistor	56 k	5 % 0.063 W 0402
R616	1430700	Chip resistor	10	5 % 0.063 W 0402
R617	1430746	Chip resistor	560	5 % 0.063 W 0402
R619	1430774	Chip resistor	6.8 k	5 % 0.063 W 0402
R620	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R621	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R622	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R623	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R624	1430718	Chip resistor	47	5 % 0.063 W 0402
R625	1430722	Chip resistor	68	5 % 0.063 W 0402
R626	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402
R627	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R628	1430700	Chip resistor	10	5 % 0.063 W 0402
R629	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402

R630	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402
R631	1430710	Chip resistor	22	5 % 0.063 W 0402
R632	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R635	1430714	Chip resistor	33	5 % 0.063 W 0402
R636	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R637	1430714	Chip resistor	33	5 % 0.063 W 0402
R639	1430742	Chip resistor	390	5 % 0.063 W 0402
R640	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R641	1430726	Chip resistor	100	5 % 0.063 W 0402
R645	1430700	Chip resistor	10	5 % 0.063 W 0402
R646	1430730	Chip resistor	150	5 % 0.063 W 0402
R647	1430734	Chip resistor	220	5 % 0.063 W 0402
R648	1430740	Chip resistor	330	5 % 0.063 W 0402
R652	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R654	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R656	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R659	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R660	1430700	Chip resistor	10	5 % 0.063 W 0402
R663	1430722	Chip resistor	68	5 % 0.063 W 0402
R664	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R667	1430748	Chip resistor	680	5 % 0.063 W 0402
R668	1430718	Chip resistor	47	5 % 0.063 W 0402
R669	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R670	1430742	Chip resistor	390	5 % 0.063 W 0402
R671	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R672	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R673	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R674	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R675	1430700	Chip resistor	10	5 % 0.063 W 0402
R681	1430726	Chip resistor	100	5 % 0.063 W 0402
R683	1430802	Chip resistor	82 k	5 % 0.063 W 0402
R700	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R701	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R702	1430700	Chip resistor	10	5 % 0.063 W 0402
R703	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R705	1430726	Chip resistor	100	5 % 0.063 W 0402
R710	1430774	Chip resistor	6.8 k	5 % 0.063 W 0402
R712	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R713	1430784	Chip resistor	15 k	5 % 0.063 W 0402
R714	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R715	1430758	Chip resistor	1.5 k	5 % 0.063 W 0402
R716	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R717	1430700	Chip resistor	10	5 % 0.063 W 0402
R718	1430700	Chip resistor	10	5 % 0.063 W 0402
R721	1430724	Chip resistor	82	5 % 0.063 W 0402
R801	1430724	Chip resistor	82	5 % 0.063 W 0402
R802	1430808	Chip resistor	150 k	5 % 0.063 W 0402
R804	1430734	Chip resistor	220	5 % 0.063 W 0402

R805	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R806	1430746	Chip resistor	560	5 % 0.063 W 0402
R807	1430700	Chip resistor	10	5 % 0.063 W 0402
R808	1430718	Chip resistor	47	5 % 0.063 W 0402
R809	1430700	Chip resistor	10	5 % 0.063 W 0402
R810	1430718	Chip resistor	47	5 % 0.063 W 0402
R811	1430700	Chip resistor	10	5 % 0.063 W 0402
R813	1430700	Chip resistor	10	5 % 0.063 W 0402
R814	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R815	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R816	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R817	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R818	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R819	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R820	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R821	1430772	Chip resistor	5.6 k	5 % 0.063 W 0402
R823	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R824	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R825	1430710	Chip resistor	22	5 % 0.063 W 0402
R901	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R902	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R903	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R904	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R906	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R907	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
C001	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C002	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C003	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C004	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C005	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C006	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C007	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C008	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C009	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C011	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C012	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C013	2320544	Ceramic cap.	22 p	5 % 50 V 0402
C015	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C016	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C017	2610100	Tantalum cap.	1 u	20 % 10 V 2.0x1.3x1.2
C018	2604456	Tantalum cap.	4.7 u	20 % 16 V 4.7x2.6x2.1
C019	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C020	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C021	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C022	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C023	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C024	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C025	2320576	Ceramic cap.	470 p	5 % 50 V 0402

C030	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C050	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C051	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C052	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C053	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C054	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C055	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C056	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C057	2310777	Ceramic cap.	22 n	20 % 50 V 0805
C058	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C059	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C060	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C062	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C063	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C064	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C066	2312410	Ceramic cap.	1.0 u	10 % 16 V 1206
C068	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C069	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C070	2312410	Ceramic cap.	1.0 u	10 % 16 V 1206
C071	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C072	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C076	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C077	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C600	2320520	Ceramic cap.	2.2 p	0.25 % 50 V 0402
C601	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C602	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C603	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C604	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C605	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C606	2320602	Ceramic cap.	4.7 p	0.25 % 50 V 0402
C607	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C608	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C609	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C610	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C611	2320538	Ceramic cap.	12 p	5 % 50 V 0402
C612	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C613	2320520	Ceramic cap.	2.2 p	0.25 % 50 V 0402
C614	2320554	Ceramic cap.	56 p	5 % 50 V 0402
C616	2310769	Ceramic cap.	15 n	20 % 50 V 0805
C617	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C618	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C619	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C620	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C621	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C622	2320544	Ceramic cap.	22 p	5 % 50 V 0402
C623	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C624	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C625	2320546	Ceramic cap.	27 p	5 % 50 V 0402

C627	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C628	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C629	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C630	2320554	Ceramic cap.	56 p	5 % 50 V 0402
C631	2320556	Ceramic cap.	68 p	5 % 50 V 0402
C632	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C633	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C634	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C635	2320534	Ceramic cap.	8.2 p	0.25 % 50 V 0402
C636	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C637	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C638	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C639	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C640	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C641	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C642	2320602	Ceramic cap.	4.7 p	0.25 % 50 V 0402
C643	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C644	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C654	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C655	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C656	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C657	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C658	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C659	2320556	Ceramic cap.	68 p	5 % 50 V 0402
C660	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C662	2320602	Ceramic cap.	4.7 p	0.25 % 50 V 0402
C663	2320576	Ceramic cap.	470 p	5 % 50 V 0402
C665	2310780	Ceramic cap.	68 n	10 % 25 V 0805
C669	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C670	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C671	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C675	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C676	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C677	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C678	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C679	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C680	2610016	Tantalum cap.	0.47 u	10 % 25 V 3.2x1.6x1.6
C681	2320552	Ceramic cap.	47 p	5 % 50 V 0402
C682	2320552	Ceramic cap.	47 p	5 % 50 V 0402
C683	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C686	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C690	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C691	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C701	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C702	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C703	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C704	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C705	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402

C706	2320540	Ceramic cap.	15 p	5 % 50 V 0402
C709	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C712	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C714	2320534	Ceramic cap.	8.2 p	0.25 % 50 V 0402
C715	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C716	2320520	Ceramic cap.	2.2 p	0.25 % 50 V 0402
C718	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C719	2320544	Ceramic cap.	22 p	5 % 50 V 0402
C720	2312410	Ceramic cap.	1.0 u	10 % 16 V 1206
C721	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C722	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C723	2310490	Ceramic cap.	360 p	2 % 50 V 0805
C725	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C726	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C727	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C728	2320594	Ceramic cap.	2.7 n	5 % 50 V 0402
C729	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C730	2320592	Ceramic cap.	2.2 n	5 % 50 V 0402
C734	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C735	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C736	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C737	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C740	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C749	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C801	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C802	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C804	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C805	2320530	Ceramic cap.	5.6 p	0.25 % 50 V 0402
C806	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C807	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C808	2320540	Ceramic cap.	15 p	5 % 50 V 0402
C810	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C811	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C813	2320530	Ceramic cap.	5.6 p	0.25 % 50 V 0402
C815	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C816	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C818	2604456	Tantalum cap.	4.7 u	20 % 16 V 4.7x2.6x2.1
C820	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C822	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C824	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C825	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C826	2310752	Ceramic cap.	10 n	20 % 50 V 0805
C827	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C828	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C830	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C831	2320522	Ceramic cap.	2.7 p	0.25 % 50 V 0402
C834	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C835	2320548	Ceramic cap.	33 p	5 % 50 V 0402

C839	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C840	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C901	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C904	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C905	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C906	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C907	2320548	Ceramic cap.	33 p	5 % 50 V 0402
L601	3641574	Chip coil	68 n	5 % Q=40/200 MHz 0805
L602	3641574	Chip coil	68 n	5 % Q=40/200 MHz 0805
L603	3641574	Chip coil	68 n	5 % Q=40/200 MHz 0805
L604	3641574	Chip coil	68 n	5 % Q=40/200 MHz 0805
L605	3641574	Chip coil	68 n	5 % Q=40/200 MHz 0805
L651	3641548	Chip coil	100 n	10 % Q=40/150 MHz 0805
L653	3641548	Chip coil	100 n	10 % Q=40/150 MHz 0805
L702	3608439	Chip coil	820 n	5 % 1206
L704	3660102	Coil adj.	320 u	2 % Q=80 5X5
L705	3608439	Chip coil	820 n	5 % 1206
L706	3608502	Chip coil		5 % Q=28/35 MHz 1206
L709	3608365	Chip coil	100 u	5 % Q=18 3.2x2.5
L710	3641302	Chip coil	470 n	5 % Q=30/25 MHz 1008
L801	3641262	Ferrite bead 30r/100mhz 2a 1206		1206
G600	4350065	Vcxo 14.85mhz+–15ppm 3.6v jrv2		
Z692	4511083	Saw filter 836.5+–12.5 M		/5 5.4x4.7
Z700	4512051	Dupl 824–849/869–894mhz 45x15.3		45x15.3
Z702	4513060	SM, xtal bpf 45mhz+–15khz/3db t		TR6
Z703	4550102	Cer.filt 881.5+–12.5mhz 10x7.8		10x7.8
Z704	4556922	Cer.filt 450+–15khz 9.6x8.5rad		9.6x8.5rad
V001	4210020	Transistor	BCP69–25	pnp 20 V 1 A SOT223
V002	4110034	Schottky diode	MBRS140	40 V 1 A DO214AA
V003	4219904	Transistor x 2	UMX1	npn 40 V SOT363
V005	4110028	Trans. supr.	16V	23 A 600 W DO214AA
V006	4210102	Transistor	BC858W	pnp 30 V 100 mA 200MWSOT323
V007	4200226	Darl. transistor	BCV27	npn 30 V 300 mA SOT23
V008	4200226	Darl. transistor	BCV27	npn 30 V 300 mA SOT23
V009	4210100	Transistor	BC848W	npn 30 V SOT323
V030	4864388	Led	Green	0603
V033	4864388	Led	Green	0603
V034	4864388	Led	Green	0603
V035	4864388	Led	Green	0603
V036	4864388	Led	Green	0603
V038	4864388	Led	Green	0603
V040	4864388	Led	Green	0603
V041	4864388	Led	Green	0603
V042	4200917	Transistor	BC848B/BCW32	npn 30 V 100 mA SOT23
V043	4200917	Transistor	BC848B/BCW32	npn 30 V 100 mA SOT23
V050	4210100	Transistor	BC848W	npn 30 V SOT323
V051	4100285	Diode x 2	BAV99	70 V 200 mA SER.SOT23

V053	4219922	Transistor x 2		UM6
V100	4200909	Transistor	BC858B/BCW30	pnp 30 V 100 mA SOT23
V601	4210132	Transistor		SOT323
V602	4210132	Transistor		SOT323
V603	4110018	Cap. diode	BB135	30 V SOD323
V651	4210102	Transistor	BC858W	pnp 30 V 100 mA 200MWSOT323
V654	4210100	Transistor	BC848W	npn 30 V SOT323
V655	4100567	Sch. diode x 2	BAS70–04	70V15 mA SERSOT23
V657	4210066	Transistor	BFR93AW	npn 12 V 35 mA SOT323
V658	4210079	Transistor	BFS17	npn 15 V 50 mA SOT23
V659	4104951	Cap. diode x 2	BBY39	SOT23
V660	4210058	Transistor	MRF947	npn 10 V 50 mA SOT323
V661	4210132	Transistor		SOT323
V662	4210058	Transistor	MRF947	npn 10 V 50 mA SOT323
V700	4210004	Transistor	BFG67X	npn 20 V 50 mA 7.5GHZSOT143
V701	4115802	Sch. diode x 2	4V	30 mA SOT23
V703	4210066	Transistor	BFR93AW	npn 12 V 35 mA SOT323
V801	4100567	Sch. diode x 2	BAS70–04	70V15 mA SERSOT23
V803	4210091	Transistor	BFG540W/X	npn 15 V SOT343
V804	4210133	Transistor	BFG10W/X	npn 10 V 0.25 A SOT343
V805	4210072	Transistor	BLT71	npn 8V V 0.5 A SOT223
V807	4210054	Transistor	FMMT589	pnp 30 V 1 A SOT23
V808	4219922	Transistor x 2		UM6
V809	4219904	Transistor x 2	UMX1	npn 40 V SOT363
V810	4210102	Transistor	BC858W	pnp 30 V 100 mA 200MWSOT323
V901	4210054	Transistor	FMMT589	pnp 30 V 1 A SOT23
V902	4219904	Transistor x 2	UMX1	npn 40 V SOT363
V903	4219904	Transistor x 2	UMX1	npn 40 V SOT363
D001	4375943	IC, MCU		TQFP100
D002	4370044	IC, EEPROM	NMP70044	SO8S
N001	4370084	IC, mas1013s–t muumi ssop2	NMP70084	SSOP24
N002	4375062	IC, nasta3 mas1006b tqfp	NMP75062	TQFP64
N650	4349616	IC, 2xsynth 1.1ghz 3v sso	UMA1015M	SSO20
N700	4349694	IC, if amp+fm detector sso	TA31136	SSO16
S002	5200120	Push button switch 6.4x5.2 smd		
X001	5469001	System conn 16af+		4DC+JACK DCT2 SSM
X002	5449078	SM, conn pcb/pcb 16pol f pitch0.8		PITCH0.8MM
X701	9510248	Antenna clip		4D25100 NHA–2NA
P001	9854046	PC board	JRX1	46.0x152.0x1.0 m4 2/pa
	9854046	PCB JRX1 46.0X152.0X1.0 M4 2/PA		

Part List of JR7 (Code: 0200843, EDMS Issue:13.0)

ITEM	CODE	DESCRIPTION	VALUE	TYPE
R001	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R002	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R003	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R004	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R005	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R006	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R007	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R008	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R009	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R011	1430790	Chip resistor	27 k	5 % 0.063 W 0402
R014	1430830	Chip resistor	1.0 M	5 % 0.063 W 0402
R015	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R016	1430758	Chip resistor	1.5 k	5 % 0.063 W 0402
R017	1430740	Chip resistor	330	5 % 0.063 W 0402
R018	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R019	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R020	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R021	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R022	1430780	Chip resistor	12 k	5 % 0.063 W 0402
R023	1430786	Chip resistor	18 k	5 % 0.063 W 0402
R024	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R025	1430730	Chip resistor	150	5 % 0.063 W 0402
R026	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R027	1430786	Chip resistor	18 k	5 % 0.063 W 0402
R028	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R029	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R030	1430734	Chip resistor	220	5 % 0.063 W 0402
R031	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R032	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R033	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R034	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R035	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R036	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R037	1430710	Chip resistor	22	5 % 0.063 W 0402
R039	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R040	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R041	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R042	1430710	Chip resistor	22	5 % 0.063 W 0402
R043	1430710	Chip resistor	22	5 % 0.063 W 0402
R044	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R050	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R051	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R052	1430778	Chip resistor	10 k	5 % 0.063 W 0402

R053	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R056	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R058	1430710	Chip resistor	22	5 % 0.063 W 0402
R059	1430710	Chip resistor	22	5 % 0.063 W 0402
R060	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R061	1430816	Chip resistor	330 k	5 % 0.063 W 0402
R062	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R063	1430710	Chip resistor	22	5 % 0.063 W 0402
R064	1430700	Chip resistor	10	5 % 0.063 W 0402
R065	1430744	Chip resistor	470	5 % 0.063 W 0402
R066	1430718	Chip resistor	47	5 % 0.063 W 0402
R067	1430744	Chip resistor	470	5 % 0.063 W 0402
R072	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R073	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R100	1430812	Chip resistor	220 k	5 % 0.063 W 0402
R101	1430816	Chip resistor	330 k	5 % 0.063 W 0402
R102	1430822	Chip resistor	560 k	5 % 0.063 W 0402
R103	1430830	Chip resistor	1.0 M	5 % 0.063 W 0402
R104	1430826	Chip resistor	680 k	5 % 0.063 W 0402
R106	1430808	Chip resistor	150 k	5 % 0.063 W 0402
R107	1430790	Chip resistor	27 k	5 % 0.063 W 0402
R600	1430726	Chip resistor	100	5 % 0.063 W 0402
R604	1430710	Chip resistor	22	5 % 0.063 W 0402
R605	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402
R606	1430724	Chip resistor	82	5 % 0.063 W 0402
R607	1430726	Chip resistor	100	5 % 0.063 W 0402
R608	1430776	Chip resistor	8.2 k	5 % 0.063 W 0402
R609	1430720	Chip resistor	56	5 % 0.063 W 0402
R610	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R611	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R612	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R613	1430728	Chip resistor	120	5 % 0.063 W 0402
R614	1430718	Chip resistor	47	5 % 0.063 W 0402
R615	1430798	Chip resistor	56 k	5 % 0.063 W 0402
R616	1430700	Chip resistor	10	5 % 0.063 W 0402
R617	1430746	Chip resistor	560	5 % 0.063 W 0402
R619	1430774	Chip resistor	6.8 k	5 % 0.063 W 0402
R620	1430796	Chip resistor	47 k	5 % 0.063 W 0402
R621	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R622	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R623	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R624	1430718	Chip resistor	47	5 % 0.063 W 0402
R625	1430722	Chip resistor	68	5 % 0.063 W 0402
R626	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402
R627	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R628	1430700	Chip resistor	10	5 % 0.063 W 0402
R629	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402
R630	1430832	Chip resistor	2.7 k	5 % 0.063 W 0402

R631	1430710	Chip resistor	22	5 % 0.063 W 0402
R632	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R635	1430714	Chip resistor	33	5 % 0.063 W 0402
R636	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R637	1430714	Chip resistor	33	5 % 0.063 W 0402
R639	1430742	Chip resistor	390	5 % 0.063 W 0402
R640	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R641	1430726	Chip resistor	100	5 % 0.063 W 0402
R645	1430700	Chip resistor	10	5 % 0.063 W 0402
R646	1430730	Chip resistor	150	5 % 0.063 W 0402
R647	1430734	Chip resistor	220	5 % 0.063 W 0402
R648	1430740	Chip resistor	330	5 % 0.063 W 0402
R652	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R654	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R656	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R659	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R660	1430700	Chip resistor	10	5 % 0.063 W 0402
R663	1430722	Chip resistor	68	5 % 0.063 W 0402
R664	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R667	1430748	Chip resistor	680	5 % 0.063 W 0402
R668	1430718	Chip resistor	47	5 % 0.063 W 0402
R669	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R670	1430742	Chip resistor	390	5 % 0.063 W 0402
R671	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R672	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R673	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R674	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R675	1430700	Chip resistor	10	5 % 0.063 W 0402
R681	1430726	Chip resistor	100	5 % 0.063 W 0402
R683	1430802	Chip resistor	82 k	5 % 0.063 W 0402
R700	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R701	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R702	1430700	Chip resistor	10	5 % 0.063 W 0402
R703	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R705	1430726	Chip resistor	100	5 % 0.063 W 0402
R710	1430774	Chip resistor	6.8 k	5 % 0.063 W 0402
R712	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R713	1430784	Chip resistor	15 k	5 % 0.063 W 0402
R714	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R715	1430758	Chip resistor	1.5 k	5 % 0.063 W 0402
R716	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R717	1430700	Chip resistor	10	5 % 0.063 W 0402
R718	1430700	Chip resistor	10	5 % 0.063 W 0402
R721	1430724	Chip resistor	82	5 % 0.063 W 0402
R801	1430724	Chip resistor	82	5 % 0.063 W 0402
R802	1430808	Chip resistor	150 k	5 % 0.063 W 0402
R804	1430734	Chip resistor	220	5 % 0.063 W 0402
R805	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402

R806	1430746	Chip resistor	560	5 % 0.063 W 0402
R807	1430700	Chip resistor	10	5 % 0.063 W 0402
R808	1430718	Chip resistor	47	5 % 0.063 W 0402
R809	1430700	Chip resistor	10	5 % 0.063 W 0402
R810	1430718	Chip resistor	47	5 % 0.063 W 0402
R811	1430700	Chip resistor	10	5 % 0.063 W 0402
R813	1430700	Chip resistor	10	5 % 0.063 W 0402
R814	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R815	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R816	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R817	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
R818	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R819	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R820	1430792	Chip resistor	33 k	5 % 0.063 W 0402
R821	1430772	Chip resistor	5.6 k	5 % 0.063 W 0402
R823	1430804	Chip resistor	100 k	5 % 0.063 W 0402
R824	1430770	Chip resistor	4.7 k	5 % 0.063 W 0402
R825	1430710	Chip resistor	22	5 % 0.063 W 0402
R901	1430762	Chip resistor	2.2 k	5 % 0.063 W 0402
R902	1430788	Chip resistor	22 k	5 % 0.063 W 0402
R903	1430764	Chip resistor	3.3 k	5 % 0.063 W 0402
R904	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R906	1430778	Chip resistor	10 k	5 % 0.063 W 0402
R907	1430754	Chip resistor	1.0 k	5 % 0.063 W 0402
C001	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C002	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C003	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C004	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C005	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C006	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C007	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C008	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C009	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C011	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C012	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C013	2320544	Ceramic cap.	22 p	5 % 50 V 0402
C015	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C016	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C017	2610100	Tantalum cap.	1 u	20 % 10 V 2.0x1.3x1.2
C018	2604456	Tantalum cap.	4.7 u	20 % 16 V 4.7x2.6x2.1
C019	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C020	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C021	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C022	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C023	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C024	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C025	2320576	Ceramic cap.	470 p	5 % 50 V 0402
C030	2320546	Ceramic cap.	27 p	5 % 50 V 0402

C050	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C051	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C052	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C053	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C054	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C055	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C056	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C057	2310777	Ceramic cap.	22 n	20 % 50 V 0805
C058	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C059	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C060	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C062	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C063	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C064	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C066	2312410	Ceramic cap.	1.0 u	10 % 16 V 1206
C068	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C069	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C070	2312410	Ceramic cap.	1.0 u	10 % 16 V 1206
C071	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C072	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C076	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C077	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C600	2320520	Ceramic cap.	2.2 p	0.25 % 50 V 0402
C601	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C602	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C603	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C604	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C605	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C606	2320602	Ceramic cap.	4.7 p	0.25 % 50 V 0402
C607	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C608	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C609	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C610	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C611	2320538	Ceramic cap.	12 p	5 % 50 V 0402
C612	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C613	2320520	Ceramic cap.	2.2 p	0.25 % 50 V 0402
C614	2320554	Ceramic cap.	56 p	5 % 50 V 0402
C616	2310769	Ceramic cap.	15 n	20 % 50 V 0805
C617	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C618	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C619	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C620	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C621	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C622	2320544	Ceramic cap.	22 p	5 % 50 V 0402
C623	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C624	2310791	Ceramic cap.	33 n	20 % 50 V 0805
C625	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C627	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6

C628	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C629	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C630	2320554	Ceramic cap.	56 p	5 % 50 V 0402
C631	2320556	Ceramic cap.	68 p	5 % 50 V 0402
C632	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C633	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C634	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C635	2320534	Ceramic cap.	8.2 p	0.25 % 50 V 0402
C636	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C637	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C638	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C639	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C640	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C641	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C642	2320602	Ceramic cap.	4.7 p	0.25 % 50 V 0402
C643	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C644	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C654	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C655	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C656	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C657	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C658	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C659	2320556	Ceramic cap.	68 p	5 % 50 V 0402
C660	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C662	2320602	Ceramic cap.	4.7 p	0.25 % 50 V 0402
C663	2320576	Ceramic cap.	470 p	5 % 50 V 0402
C665	2310780	Ceramic cap.	68 n	10 % 25 V 0805
C669	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C670	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C671	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C675	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C676	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C677	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C678	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C679	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C680	2610016	Tantalum cap.	0.47 u	10 % 25 V 3.2x1.6x1.6
C681	2320552	Ceramic cap.	47 p	5 % 50 V 0402
C682	2320552	Ceramic cap.	47 p	5 % 50 V 0402
C683	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C686	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C690	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C691	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C701	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C702	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C703	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C704	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C705	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C706	2320540	Ceramic cap.	15 p	5 % 50 V 0402

C709	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C712	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C714	2320534	Ceramic cap.	8.2 p	0.25 % 50 V 0402
C715	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C716	2320520	Ceramic cap.	2.2 p	0.25 % 50 V 0402
C718	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C719	2320544	Ceramic cap.	22 p	5 % 50 V 0402
C720	2312410	Ceramic cap.	1.0 u	10 % 16 V 1206
C721	2320546	Ceramic cap.	27 p	5 % 50 V 0402
C722	2310784	Ceramic cap.	100 n	10 % 25 V 0805
C723	2310490	Ceramic cap.	360 p	2 % 50 V 0805
C725	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C726	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C727	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C728	2320594	Ceramic cap.	2.7 n	5 % 50 V 0402
C729	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C730	2320592	Ceramic cap.	2.2 n	5 % 50 V 0402
C734	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C735	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C736	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C737	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C740	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C749	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C801	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C802	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C804	2320524	Ceramic cap.	3.3 p	0.25 % 50 V 0402
C805	2320530	Ceramic cap.	5.6 p	0.25 % 50 V 0402
C806	2604209	Tantalum cap.	1.0 u	20 % 16 V 3.2x1.6x1.6
C807	2320560	Ceramic cap.	100 p	5 % 50 V 0402
C808	2320540	Ceramic cap.	15 p	5 % 50 V 0402
C810	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C811	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C813	2320530	Ceramic cap.	5.6 p	0.25 % 50 V 0402
C815	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C816	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C818	2604456	Tantalum cap.	4.7 u	20 % 16 V 4.7x2.6x2.1
C820	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C822	2320107	Ceramic cap.	10 n	5 % 50 V 0603
C824	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C825	2320526	Ceramic cap.	3.9 p	0.25 % 50 V 0402
C826	2310752	Ceramic cap.	10 n	20 % 50 V 0805
C827	2320584	Ceramic cap.	1.0 n	5 % 50 V 0402
C828	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C830	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C831	2320522	Ceramic cap.	2.7 p	0.25 % 50 V 0402
C834	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C835	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C839	2320107	Ceramic cap.	10 n	5 % 50 V 0603

C840	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C901	2611668	Tantalum cap.	4.7 u	20 % 10 V 3.2x1.6x1.6
C904	2604199	Tantalum cap.	2.2 u	20 % 3.2x1.6x1.6
C905	2320548	Ceramic cap.	33 p	5 % 50 V 0402
C906	2320596	Ceramic cap.	3.3 n	5 % 50 V 0402
C907	2320548	Ceramic cap.	33 p	5 % 50 V 0402
L601	3641574	Chip coil	68 n	5 % Q=40/200 MHz 0805
L602	3641574	Chip coil	68 n	5 % Q=40/200 MHz 0805
L603	3641574	Chip coil	68 n	5 % Q=40/200 MHz 0805
L604	3641574	Chip coil	68 n	5 % Q=40/200 MHz 0805
L605	3641574	Chip coil	68 n	5 % Q=40/200 MHz 0805
L651	3641548	Chip coil	100 n	10 % Q=40/150 MHz 0805
L653	3641548	Chip coil	100 n	10 % Q=40/150 MHz 0805
L702	3608439	Chip coil	820 n	5 % 1206
L704	3660102	Coil adj.	320 u	2 % Q=80 5X5
L705	3608439	Chip coil	820 n	5 % 1206
L706	3608502	Chip coil		5 % Q=28/35 MHz 1206
L709	3608365	Chip coil	100 u	5 % Q=18 3.2x2.5
L710	3641302	Chip coil	470 n	5 % Q=30/25 MHz 1008
L801	3641262	Ferrite bead 30r/100mhz 2a 1206		1206
G600	4350065	Vcxo 14.85mhz+–15ppm 3.6v jrv2		
Z692	4511083	Saw filter	836.5+–12.5 M	/5 5.4x4.7
Z700	4512051	Dupl 824–849/869–894mhz 45x15.3		45x15.3
Z702	4513060	SM, xtal bpf 45mhz+–15khz/3db t		TR6
Z703	4550102	Cer.filt 881.5+–12.5mhz 10x7.8		10x7.8
Z704	4556922	Cer.filt 450+–15khz 9.6x8.5rad		9.6x8.5rad
V001	4210020	Transistor	BCP69–25	pnp 20 V 1 A SOT223
V002	4110034	Schottky diode	MBRS140	40 V 1 A DO214AA
V003	4219904	Transistor x 2	UMX1	npn 40 V SOT363
V005	4110028	Trans. supr.	16V	23 A 600 W DO214AA
V006	4210102	Transistor	BC858W	pnp 30 V 100 mA 200MWSOT323
V007	4200226	Darl. transistor	BCV27	npn 30 V 300 mA SOT23
V008	4200226	Darl. transistor	BCV27	npn 30 V 300 mA SOT23
V009	4210100	Transistor	BC848W	npn 30 V SOT323
V030	4864388	Led	Green	0603
V033	4864388	Led	Green	0603
V034	4864388	Led	Green	0603
V035	4864388	Led	Green	0603
V036	4864388	Led	Green	0603
V038	4864388	Led	Green	0603
V040	4864388	Led	Green	0603
V041	4864388	Led	Green	0603
V042	4200917	Transistor	BC848B/BCW32	npn 30 V 100 mA SOT23
V043	4200917	Transistor	BC848B/BCW32	npn 30 V 100 mA SOT23
V044	4100189	Schottky diode	BAS70–05	70 V 15 mA SOT23
V050	4210100	Transistor	BC848W	npn 30 V SOT323
V051	4100285	Diode x 2	BAV99	70 V 200 mA SER.SOT23

V053	4219922	Transistor x 2		UM6
V100	4200909	Transistor	BC858B/BCW30	pnp 30 V 100 mA SOT23
V601	4210132	Transistor		SOT323
V602	4210132	Transistor		SOT323
V603	4110018	Cap. diode	BB135	30 V SOD323
V651	4210102	Transistor	BC858W	pnp 30 V 100 mA 200MWSOT323
V654	4210100	Transistor	BC848W	npn 30 V SOT323
V655	4100567	Sch. diode x 2	BAS70–04	70V15 mA SERSOT23
V657	4210066	Transistor	BFR93AW	npn 12 V 35 mA SOT323
V658	4210079	Transistor	BFS17	npn 15 V 50 mA SOT23
V659	4104951	Cap. diode x 2	BBY39	SOT23
V660	4210058	Transistor	MRF947	npn 10 V 50 mA SOT323
V661	4210132	Transistor		SOT323
V662	4210058	Transistor	MRF947	npn 10 V 50 mA SOT323
V700	4210004	Transistor	BFG67X	npn 20 V 50 mA 7.5GHZSOT143
V701	4115802	Sch. diode x 2	4V	30 mA SOT23
V703	4210066	Transistor	BFR93AW	npn 12 V 35 mA SOT323
V801	4100567	Sch. diode x 2	BAS70–04	70V15 mA SERSOT23
V803	4210091	Transistor	BFG540W/X	npn 15 V SOT343
V804	4210133	Transistor	BFG10W/X	npn 10 V 0.25 A SOT343
V805	4210072	Transistor	BLT71	npn 8V V 0.5 A SOT223
V807	4210054	Transistor	FMMT589	pnp 30 V 1 A SOT23
V808	4219922	Transistor x 2		UM6
V809	4219904	Transistor x 2	UMX1	npn 40 V SOT363
V810	4210102	Transistor	BC858W	pnp 30 V 100 mA 200MWSOT323
V901	4210054	Transistor	FMMT589	pnp 30 V 1 A SOT23
V902	4219904	Transistor x 2	UMX1	npn 40 V SOT363
V903	4219904	Transistor x 2	UMX1	npn 40 V SOT363
D001	4375943	IC, MCU		TQFP100
D002	4370044	IC, EEPROM	NMP70044	SO8S
N001	4370084	IC, mas1013s–t muumi ssop2	NMP70084	SSOP24
N002	4375062	IC, nasta3 mas1006b tqfp	NMP75062	TQFP64
N650	4349616	IC, 2xsynth 1.1ghz 3v sso	UMA1015M	SSO20
N700	4349694	IC, if amp+fm detector sso	TA31136	SSO16
S002	5200120	Push button switch 6.4x5.2 smd		
X001	5469001	System conn 16af+		4DC+JACK DCT2 SSM
X002	5449078	SM, conn pcb/pcb 16pol f pitch0.8		PITCH0.8MM
X701	9510248	Antenna clip		4D25100 NHA–2NA
P001	9854046	PC board	JRX1	46.0x152.0x1.0 m4 2/pa
	9854046	PCB JRX1 46.0X152.0X1.0 M4 2/PA		

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